EVALUATING THE FINANCIAL AND NONFINANCIAL FUNCTIONS OF THE WAQFS IN OTTOMAN ECONOMY

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ABSTRACT

This study aims to evaluate the financial and nonfinancial functions of the waqfs in Ottoman economy. Within this framework, five different functions of the waqfs are defined based on literature review. In addition to this condition, fuzzy DEMATEL and fuzzy AHP approaches are considered to reach this objective. The findings show that these two methods give different results. According to fuzzy DEMATEL, it is identified that economic and financial purpose is the most significant function of the waqfs for Ottoman economy. On the other side, with respect to fuzzy AHP, it is concluded that education function of the waqfs has the highest importance. This situation indicates that economic and financial function has the highest significance when each function is considered to affect others. However, in case of a hierarchical impact between these functions, education has the highest importance instead of economic and financial issues. Thus, it is recommended that countries should implement cash waqfs as an alternative financial model for economic system. This implementation has a positive influence on commercial activities by encouraging new investments. Hence, it leads to higher economic development and living standards for the countries.
Keywords: Waqfs; Ottoman Economy; Economic History; Fuzzy DEMATEL; Fuzzy AHP

OSMANLI EKONOMİSİNDEKİ VAKIFLARIN FİNANSAL OLAN VE OLMAYAN FONKSİYONLARININ DEĞERLENDİRİLMESİ

ÖZ

Bu çalışma, vakıfların Osmanlı ekonomisindeki finansal ve finansal olmayan işlevlerini değerlendirmeyi amaçlamaktadır. Bu çerçevede, vakıfların beş farklı işlevi literatür taramasına göre tanımlanmıştır. Bu duruma ek olarak, bulanık DEMATEL ve bulanık AHP yaklaşımları kullanılarak bu hedefe ulaşmaya çalışılmıştır. Bulgular, bulanık DEMATEL ve bulanık AHP yöntemlerinin farklı sonuçlar verdiğini göstermektedir. Bulanık DEMATEL'e göre, ekonomik ve finansal amacın vakıfların Osmanlı ekonomisi için en önemli işlevi olduğu tespit edilmiştir. Diğer taraftan, bulanık AHP ile ilgili olarak, vakıfların eğitim işlevinin en büyük öneme sahip olduğu sonucuna varılmıştır. Bu durum, her bir fonksiyonun diğerleri üzerinde bir etkisi olduğu düşünüldüğünde, ekonomik ve finansal fonksiyonun en yüksek öneme sahip olduğunu göstermektedir. Ancak, bu işlevler arasında hiyerarşik bir etki olması durumunda, ekonomik ve finansal meseleler yerine eğitim en büyük öneme sahiptir. Bu sonuçları dikkate alarak ülkelerin para vakıflarını ekonomik sistem için alternatif bir finansal model olarak uygulamaları önerilmektedir. Bu uygulamanın yeni yatırımları teşvik etmesinden dolayı ticari faaliyetler üzerinde olumlu bir etkisi bulunmaktadır. Bu durum ülkelerin daha yüksek ekonomik kalkınma ve yaşam standartlarına sahip olmalarına katkı sağlayacaktır.
Anahtar Kelimeler: Para Vakıfları; Osmanlı Ekonomisi; İktisat Tarihi; Bulanık DEMATEL; Bulanık AHP

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1. INTRODUCTION

Waqfs are the institutions where the material needs for people are aimed to be satisfied. Historical and sociological examination of waqfs is of great importance. The waqf explains the process to allocate a property from the personal property to the benefit of people in such a way that it is not possible to be subject to purchase and sale. Because of that condition, waqfs must also be able to stand firmly, and for this they need a number of assets (Rusydiana and Devi, 2018:10).

One of the main objectives of the waqfs is to meet social needs in the country. With this aim, they have tried to fulfill the needs and services of people in various fields throughout history. Within this scope, they have many significant roles in the community, such as helping poor people, satisfying the hungry people, obtaining the freedom of captives and providing dowry to the poor girls and orphans (Osman et al., 2016:12).

Waqfs have many different advantages in Ottoman economic history. First of all, it has an important influence on increasing social solidarity within the community. This situation has a contributing effect on fair income distribution among the citizens (Demir, 2018a:92). Another important benefit of the waqfs is that it has a contributing effect on the improvement of the economy (Karagedikli and Tunçer, 2018:237). For instance, structures such as bazaars, shops, baths and mills were built in the history by the waqfs for the revival of various commercial activities.

In this study, it is aimed to evaluate significance of the different purposes of the waqfs in Ottoman Empire. For this purpose, main purposes of these waqfs are classified into five different categories, such as education, health, infrastructure, economic and social. In addition to them, fuzzy AHP and fuzzy DEMATEL approaches are taken into consideration in order to reach this objective. Hence, at the end of the study, it can be possible to identify which purposes have higher significance in comparison with others.

This study has some important novelties. First of all, it is the first study in which fuzzy logic is considered to evaluate the performance of the waqfs in Ottoman economics. This situation has an increasing effect on the originality of the study. Another important point of this study is that while examining the significance of the different purposes of Ottoman waqfs, it can be possible to provide recommendation to improve economic condition for today's environment. Therefore, it is believed that this study makes an important contribution to the literature.

There are six different sections in this study. This introduction section provides an overview about the importance of waqfs for the economies. After that, the second section provides necessary information about the waqfs in Ottoman economy. The third section reviews similar studies and identifies the gap in the literature for this

context. Next, the fourth section explains fuzzy AHP and fuzzy DEMATEL approaches. In the fifth section, analysis results are shared. The final section provides a discussion and conclusion according to these analysis results.

2. WAQFS IN OTTOMAN ECONOMY

The waqf has an important place in the life of the Ottoman society. They mainly performed necessary infrastructure investments for the Ottoman cities and carried out an important function in the basic services required by the community (Demir, 2018b:2). It is thought that there were more than 30,000 waqfs in Ottoman economy (Kahf and Mohomed, 2017:13). As it can be understood that waqfs became a very critical issue for Ottoman economic life in the past (Orbay, 2017:135; Mujani et al., 2018:550)

In Ottoman economy, waqfs have provided services in various fields and in different status. The first type of the waqf is charitable waqfs. They mainly focused on the beneficial issues for the people in the society, such as constructing mosque and water well and giving food to the poor people. In addition to them, opening library, dormitory, yard, hospitals and guesthouse can be given examples for the activities of charitable waqfs. Because they are charitable waqfs, the founders of them are not in any expectation (Rizal and Amin, 2017:669).

The second type of the waqfs is the family waqfs. Briefly, family waqfs are the institutions that have been established for the benefit of the son of the founder. In other words, the main purpose of this type of waqfs is to be helpful for family member (Hathaway, 2016:130). Additionally, after satisfying the needs of the family members, this waqfs can help other people who are in need. On the other side, the last type of waqfs is named as special waqfs. Their main purpose is to be helpful for the people in extraordinary conditions. Natural disasters and epidemics can be given as examples for these conditions.

While analyzing historical examples, it is obvious that waqfs can be founded for many different purposes. Firstly, some waqfs in the history aimed to contribute educational improvement of the people in the country (Rusydiana and Devi, 2018:11). For this purpose, they gave financial supports to the students who need money. Another significant purpose of the waqfs in the history is related to the health issues. In this framework, some waqfs in the history supported hospitals and the health clinics in order to have more effective health services in the country (Che Hassan and Rahman, 2018:68).

In addition to them, waqf may also focus on infrastructure services in the country (Kahf and Mohomed, 2017:13-15). In this context, construction, maintenance and restoration services can be conducted by these waqfs. This situation has a positive impact on the life quality of the people in the country. Moreover, waqfs can also be

aimed to have economic purposes (Azrai Azaimi Ambrose et al., 2018:398). Within this framework, they give financial support for the companies. With the help of this support, these companies can get a chance to increase their investment (Demir, 2018c:94). This condition makes a significant contribution on the economic development of the country. The final purpose of the waqfs can be related to the social factors. In this purpose, waqfs give financial support to the people who need money.

3. LITERATURE REVIEW

The subject of the waqfs in economies attracted the attention of many different researchers in the literature. Most of the studies in this context are related to the historical view of the waqfs. For example, Ahmad (2015) focused on the historical evaluation of the cash waqfs. In this study, it is defined that the thought of injustice associated with interest-based loans increased the popularity of cash waqfs. Zakaria and Muda (2017) made a literature review related to the implementation of the cash waqfs in Malaysia. In this study, it is also underlined that cash waqfs promote commercial transactions. Shaikh (2018) made a historical review for cash waqf system and defined that the cash waqfs have a great importance to increase the sources for investment.

In addition to them, some of these studies underlined the importance of the waqfs as an alternative model for the economic system. Kahf and Mohomed (2017) made a study for this concept and concluded that cash waqf system has many similarities for Islamic finance system of today's environment. Parallel to this study, Iman and Mohammad (2017) asserted that cash waqf system is accepted as a framework for entrepreneurship because it leads to increase investment in the country. Traore et al. (2018) concluded that cash waqf system is very similar with the Mudharabah approach in Islamic finance. Azrai Azaimi Ambrose et al. (2018) also proposed a model for waqf financing public goods. Karagedikli and Tunçer (2018) explained the similarities and differences between cash waqf system and modern banking.

The role of the waqfs on health effectiveness was evaluated in many different studies. For instance, Kamaruddin et al. (2018) assessed the waqf management practices in Malaysia. They reached the conclusion that waqfs have important influence on the effectiveness of health system. Similar to this study, Hassan et al. (2018), Ibrahim (2018), Che Hassan and Rahman (2018) and Mohammed and Ahmed (2017) also focused on this subject in their studies and they identified that waqfs lead to more effective health systems. On the other hand, Yaakob et al. (2017), Shaikh et al. (2017) and Mutalib and Maamor (2018) the positive effects of the waqfs on infrastructure system of the countries.

Some studies also focused on the waqf system in Ottoman Empire. Orbay (2017) tried to identify the imperial waqfs in the Ottoman waqf system. The main difference of this type of waqfs is that they can control much higher amount of money by comparing

with other types. As a result, it is determined that there is a strong need for auditing imperial waqfs. Bulut and Korkut (2016) defined that Ottoman waqfs play a key role in the sustainable education system. Rusydiana and Devi (2018), Mujani et al. (2018) and Harun et al. (2016) also underlined the significance of the same aspect in their studies. Ambrose et al. (2015) stated that cash waqfs have a contributing effect to solve budget deficit problem in Ottoman Empire. Aziz (2017), Mohd Thas Thaker et al. (2016) and Aziz and Ahmad (2018) concluded that waqf system improved financial stability.

As a result of the literature review, it is identified that the subject of waqfs was very popular in the literature. These studies focused many different topics related to the waqfs. Some studies focused on the historical view of the waqfs whereas some others evaluated the importance of the waqfs as an alternative model for the economic system. In addition to them, the positive effects of the waqfs on social, health economic, infrastructure and health issues were also examined by many different researchers. However, it is defined that there is a need for a new study in which this subject is assessed by a different and original methodology, like fuzzy logic.

4. METHODOLOGY

4.1. Fuzzy DEMATEL

The expression of "decision making trial and evaluation laboratory" is represented by DEMATEL (Dinçer and Yüksel, 2018:215). The main purpose of this approach is to weight different criteria according to their significances (Dinçer, Hacıoğlu and Yüksel, 2017:19). In addition, this method is also considered to identify interdependence between different dimensions (Dinçer, Yüksel and Şenel, 2018:3126). The process of this model includes 5 different steps (Dinçer, Yüksel and Kartal, 2016). First of all, the evaluation criteria are obtained. In this process, the degree of influences is taken into consideration that are given in Table 1.

Table 1: Linguistic variables of the impact-relationship degrees

Influence Level	Triangular Fuzzy Numbers		
No (N)	0	0	0.25
Low (L)	0	0.25	0.5
Medium (M)	0.25	0.5	0.75
High (H)	0.5	0.75	1
Very High (VH))	0.75	1	1

Source: Khorasaninejad et al. 2016

In the second aspect, the initial direct-relation fuzzy matrix is created. For this purpose, equations (1) and (2) are considered (Dinçer, Yüksel and Çetiner, 2019:275).

$$\tilde{Z}=\begin{bmatrix} 0 & \tilde{z}_{12} & \cdots & & \cdots & \tilde{z}_{1n} \\ \tilde{z}_{21} & 0 & \cdots & & \cdots & \tilde{z}_{2n} \\ \vdots & \vdots & \ddots & & \cdots & \cdots \\ \vdots & \vdots & \vdots & & \ddots & \vdots \\ \tilde{z}_{n1} & \tilde{z}_{n2} & \cdots & & \cdots & 0 \end{bmatrix} \tag{1}$$

$$\tilde{Z} = \frac{\tilde{Z}^1 + \tilde{Z}^2 + \tilde{Z}^3 + \cdots \tilde{Z}^n}{n} \tag{2}$$

Thirdly, there is a normalization of the direct effect matrix. In this scope, the equations (3)-(5) are used (Dinçer, Yüksel and Martinez, 2019:156).

$$\tilde{X}=\begin{bmatrix} \tilde{x}_{11} & \tilde{x}_{12} & \cdots & & \cdots & \tilde{x}_{1n} \\ \tilde{x}_{21} & \tilde{x}_{22} & \cdots & & \cdots & \tilde{x}_{2n} \\ \vdots & \vdots & \ddots & & \cdots & \cdots \\ \vdots & \vdots & \vdots & & \ddots & \vdots \\ \tilde{x}_{n1} & \tilde{x}_{n2} & \cdots & & \cdots & \tilde{x}_{nn} \end{bmatrix} \tag{3}$$

$$\tilde{x}_{ij} = \frac{\tilde{z}_{ij}}{r} = \left(\frac{l_{ij}}{r}, \frac{m_{ij}}{r}, \frac{u_{ij}}{r} \right) \tag{4}$$

$$r = max_{1 \le i \le n} \left(\sum_{j=1}^{n} u_{ij} \right) \tag{5}$$

The fourth step is related to the calculation of the total influence fuzzy matrix. In this framework, the equations (6)-(12) are considered (Yüksel, Dinçer and Emir, 2017:29).

$$X_l=\begin{bmatrix} 0 & l'_{12} & \cdots & & \cdots & l'_{1n} \\ l'_{21} & 0 & \cdots & & \cdots & l'_{2n} \\ \vdots & \vdots & \ddots & & \cdots & \cdots \\ \vdots & \vdots & \vdots & & \ddots & \vdots \\ l'_{n1} & l'_{n2} & \cdots & & \cdots & 0 \end{bmatrix} X_m=\begin{bmatrix} 0 & m'_{12} & \cdots & & \cdots & m'_{1n} \\ m'_{21} & 0 & \cdots & & \cdots & m'_{2n} \\ \vdots & \vdots & \ddots & & \cdots & \cdots \\ \vdots & \vdots & \vdots & & \ddots & \vdots \\ m'_{n1} & m'_{n2} & \cdots & & \cdots & 0 \end{bmatrix}$$

$$X_u=\begin{bmatrix} 0 & u'_{12} & \cdots & & \cdots & u'_{1n} \\ u'_{21} & 0 & \cdots & & \cdots & u'_{2n} \\ \vdots & \vdots & \ddots & & \cdots & \cdots \\ \vdots & \vdots & \vdots & & \ddots & \vdots \\ u'_{n1} & u'_{n2} & \cdots & & \cdots & 0 \end{bmatrix} \tag{6}$$

$$\tilde{T} = \lim_{k \to \infty} \tilde{X} + \tilde{X}^2 + \cdots + \tilde{X}^k \tag{7}$$

$$\tilde{T} = \begin{bmatrix} \tilde{t}_{11} & \tilde{t}_{12} & \cdots & & \cdots & \tilde{t}_{1n} \\ \tilde{t}_{21} & \tilde{t}_{22} & \cdots & & \cdots & \tilde{t}_{2n} \\ \vdots & \vdots & \ddots & & \cdots & \cdots \\ \vdots & \vdots & \vdots & & \ddots & \vdots \\ \tilde{t}_{n1} & \tilde{t}_{n2} & \cdots & & \cdots & \tilde{t}_{nn} \end{bmatrix} \tag{8}$$

$$\tilde{t}_{ij} = \left(l''_{ij}, m''_{ij}, u''_{ij} \right) \text{ and} \tag{9}$$

$$\left[l''_{ij} \right] = X_l \times (I - X_l)^{-1} \tag{10}$$

$$\left[m''_{ij} \right] = X_m \times (I - X_m)^{-1} \tag{11}$$

$$\left[u''_{ij} \right] = X_u \times (I - X_u)^{-1} \tag{12}$$

Finally, the defuzzified total influence matrix is constructed with the help of the equations (13)-(21) (Dinçer, Yüksel and Pınarbaşı, 2019:148; Dinçer, Yüksel and Bozaykut-Bük, 2018:148).

$$u_i^{max} = max u_i, l_i^{min} = min l_i \atop j \tag{13}$$

$$\Delta_{min}^{max} = u_i^{max} - l_i^{min} \tag{14}$$

$$x_{lj} = \left(l_{ij} - l_i^{min} \right) / \Delta_{min}^{max} \tag{15}$$

$$x_{mj} = \left(l_{ij} - l_i^{min} \right) / \Delta_{min}^{max} \tag{16}$$

$$x_{uj} = \left(u_{ij} - l_i^{min} \right) / \Delta_{min}^{max} \tag{17}$$

$$x_j^{ls} = x_{mj} / \left(1 + x_{mj} - x_{lj} \right) \tag{18}$$

$$x_j^{rs} = x_{uj} / \left(1 + x_{uj} - x_{mj} \right) \tag{19}$$

$$x_j^{crisp} = \left[x_j^{ls} \left(1 - x_j^{ls} \right) + x_j^{rs} x_j^{rs} \right] / \left[1 - x_j^{ls} + x_j^{rs} \right] \tag{20}$$

$$f_{ij} = l_i^{min} + x_j^{crisp} \Delta_{min}^{max} \tag{21}$$

4.2. Fuzzy AHP

AHP represents the Analytical Hierarchy Process. Saaty (1977) developed this multicriteria decision making methodology mainly for the aim of making decisions in a complex environment. In this approach, there is a hierarchical evaluation of the criteria. Moreover, the equation (22) explains pair-wise comparison decision matrix that is used in the evaluation process.

$$\tilde{A}=\begin{bmatrix} 1 & \tilde{a}_{12} & \tilde{a}_{13} & \cdots & \tilde{a}_{1n} \\ \tilde{a}_{21} & 1 & \tilde{a}_{23} & \cdots & \tilde{a}_{2n} \\ \tilde{a}_{31} & \tilde{a}_{32} & 1 & \cdots & \tilde{a}_{3n} \\ \vdots & \vdots & \vdots & \ddots & \vdots \\ \tilde{a}_{n1} & \tilde{a}_{n2} & \tilde{a}_{n3} & \cdots & 1 \end{bmatrix}=\begin{bmatrix} 1 & \tilde{a}_{12} & \tilde{a}_{13} & \cdots & \tilde{a}_{1n} \\ 1/\tilde{a}_{12} & 1 & \tilde{a}_{23} & \cdots & \tilde{a}_{2n} \\ 1/\tilde{a}_{13} & 1/\tilde{a}_{23} & 1 & \cdots & \tilde{a}_{3n} \\ \vdots & \vdots & \vdots & \ddots & \vdots \\ 1/\tilde{a}_{1n} & 1/\tilde{a}_{2n} & 1/\tilde{a}_{3n} & \cdots & 1 \end{bmatrix} \quad (22)$$

Fuzzy pairwise comparison evaluations are represented by $\tilde{a}_{ij}$ (Dinçer et al., 2016:5). In addition to this issue, Additionally, Chang's (1996) extent analysis method is used to identify the weights of the criteria. Moreover, the triangular fuzzy numbers are shown in the equation (23).

$$M_{gi}^1, M_{gi}^2, \dots M_{gi}^m, \quad i = 1,2,\dots n, \quad (23)$$

Additionally, the fuzzy scale of the pair-wise comparison is obtained as in Table 2.

Table 2: The fuzzy scale of the pair-wise comparison

Definition	Triangular Fuzzy Numbers		
Equally important (EI)	0.5	1	1.5
Weakly more important (WI)	1	1.5	2
Strongly more important (SI)	1.5	2	2.5
Very strongly more important (VI)	2	2.5	3
Absolutely more important (AI)	2.5	3	3.5

Source: Chang, 1996

There are four different steps in the extent method. Firstly, the value of fuzzy synthetic extent is defined. This process is demonstrated in the equations (24)-(27).

$$S_i = \sum_{j=1}^m M_{gi}^j \otimes \left[\sum_{j=1}^n \sum_{j=1}^m M_{gi}^j \right]^{-1} \quad (24)$$

$$\sum_{j=1}^m M_{gi}^j = \left(\sum_{j=1}^m l_j, \sum_{j=1}^m m_j, \sum_{j=1}^m u_j \right), \quad (25)$$

$$\sum_{i=1}^n \sum_{j=1}^m M_{gi}^j = \left(\sum_{j=1}^m l_i, \sum_{j=1}^m m_i, \sum_{j=1}^m u_i \right) \quad (26)$$

$$\left[\sum_{i=1}^{n}\sum_{j=1}^{m}M_{gi}^{j}\right]^{-1} = \left(\frac{1}{\sum_{i=1}^{n}u_i}, \frac{1}{\sum_{i=1}^{n}m_i}, \frac{1}{\sum_{i=1}^{n}l_i}\right) \tag{27}$$

On the other side, the degree of the possibility of $M_2 = (l_2, m_2, u_2) \geq M_1 = (l_1, m_1, u_1)$ is defined in the second step with the help of the equations (28) and (29)

$$V(M_2 \geq M_1) = sup[min(\mu_{M_1}(x), \mu_{M_2}(y))] \tag{28}$$

$$V(M_2 \geq M_1) = hgt(M_1 \cap M_2) = \mu_{M_2}(d) =$$

$$\begin{cases} 1, & if \quad m_2 \geq m_1, \\ 0, & if \quad l_1 \geq u_2, \\ \frac{l_1 - u_2}{(m_2 - u_2) - (m_1 - l_1)} & otherwise \end{cases} \tag{29}$$

Thirdly, the degree possibility for a convex fuzzy number to be greater than *k* convex fuzzy numbers. İs defined as in the equations (30)-(32).

$$V(M \geq M_1, M_2, \ldots M_k) = V[(M \geq M_1) and (M \geq M_2) and \ldots and (M \geq M_k)] =$$
$$min V (M \geq M_i),$$
$$i = 1, 2, \ldots, k \tag{30}$$
$$d'(A_i) = min V (S_i \geq S_k) \tag{31}$$
$$W' = (d'(A_1), d'(A_2), \ldots, d'(A_n))^T, \tag{32}$$

In the final step, the normalized weight vectors are defined by considering the equation (33).

$$W' = (d(A_1), d(A_2), \ldots, d(A_n))^T, \tag{33}$$

5. ANALYSIS

The comparative analysis consists of two methods entitled Fuzzy DEMATEL and Fuzzy AHP to understand the consistency of the weighting results for waqfs in Ottoman Economy. Firstly, three decision makers have been appointed to evaluate the functions of waqfs in the influence levels of No, Low, Medium, High, and Very High. And then, linguistic variables are converted into the triangular fuzzy sets respectively. The details of the scales are represented in Table 3.

Table 3: Linguistic evaluations of decision makers

Criterion	C1			C2			C3			C4			C5		
Education (C1)	-	-	-	L	L	M	L	L	M	L	L	L	L	L	M
Infrastructure (C2)	M	L	M	-	-	-	L	L	M	L	L	L	L	L	M
Health (C3)	H	H	H	H	VH	H	-	-	-	L	L	L	M	M	H
Economic and Financial (C4)	VH	VH	VH	VH	VH	VH	H	H	H	-	-	-	M	M	H
Social (C5)	H	M	M	H	H	M	L	L	M	L	L	L	-	-	-

In the following process, the linguistic evaluations have been converted into the fuzzy numbers and the average scores are presented in Table 4.

Table 4: Initial Direct Relation Matrix

	C1			C2			C3			C4			C5		
C1	0.000	0.000	0.000	0.083	0.333	0.583	0.083	0.333	0.583	0.000	0.250	0.500	0.083	0.333	0.583
C2	0.167	0.417	0.667	0.000	0.000	0.000	0.083	0.333	0.583	0.000	0.250	0.500	0.083	0.333	0.583
C3	0.500	0.750	1.000	0.583	0.833	1.000	0.000	0.000	0.000	0.000	0.250	0.500	0.333	0.583	0.833
C4	0.750	1.000	1.000	0.750	1.000	1.000	0.417	0.667	0.917	0.000	0.000	0.000	0.333	0.583	0.833
C5	0.333	0.583	0.833	0.417	0.667	0.917	0.083	0.333	0.583	0.000	0.250	0.500	0.000	0.000	0.000

Normalized procedure has been applied, and the results are seen in Table 5.

Table 5: Normalized Fuzzy Matrix

	C1	C2	C3	C4	C5
C1	0.000 0.000 0.022	0.089 0.156 0.022	0.089 0.156 0.000	0.067 0.133 0.022	0.089 0.156 0.156
C2	0.111 0.178 0.000	0.000 0.000 0.022	0.089 0.156 0.000	0.067 0.133 0.022	0.089 0.156 0.156
C3	0.200 0.267 0.156	0.222 0.267 0.000	0.000 0.000 0.000	0.067 0.133 0.089	0.156 0.222 0.222
C4	0.267 0.267 0.200	0.267 0.267 0.111	0.178 0.244 0.000	0.000 0.000 0.089	0.156 0.222 0.222
C5	0.156 0.222 0.111	0.178 0.244 0.022	0.089 0.156 0.000	0.067 0.133 0.000	0.000 0.000 0.000

The total relation fuzzy matrix has been constructed before the defuzzification process and the matrix is provided in Table 6.

Table 6: Total Relation Fuzzy Matrix

	C1	C2	C3	C4	C5
C1	0.007 0.102 0.469	0.029 0.186 0.602	0.024 0.147 0.505	0.000 0.106 0.414	0.025 0.154 0.526
C2	0.050 0.206 0.632	0.008 0.108 0.479	0.024 0.150 0.515	0.000 0.108 0.422	0.026 0.157 0.537
C3	0.151 0.338 0.848	0.171 0.359 0.846	0.009 0.109 0.502	0.000 0.137 0.521	0.097 0.256 0.713
C4	0.237 0.451 0.931	0.237 0.454 0.929	0.124 0.303 0.767	0.000 0.100 0.455	0.110 0.299 0.783
C5	0.098 0.268 0.737	0.118 0.288 0.751	0.027 0.168 0.574	0.000 0.121 0.470	0.007 0.095 0.463

At the final step, the defuzzified values have been calculated to weight the functions of waqf in Ottoman Economy. Table 7 and 8 represent the defuzzified values and the impact-relation degrees and weights of the waqfs, respectively.

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Table 7: Defuzzified Values

	C1	C2	C3	C4	C5
C1	0.162	0.239	0.199	0.154	0.207
C2	0.260	0.168	0.204	0.157	0.212
C3	0.399	0.414	0.175	0.198	0.320
C4	0.496	0.497	0.365	0.158	0.363
C5	0.327	0.344	0.229	0.176	0.157

Table 8: Impact-Relation Degrees of Waqfs

	$\widetilde{D}_i^{\,def}$	$\widetilde{R}_i^{\,def}$	$\widetilde{D}_i^{\,def} + \widetilde{R}_i^{\,def}$	$\widetilde{D}_i^{\,def} - \widetilde{R}_i^{\,def}$	Weights
C1	0.962	1.644	2.606	-0.681	0.198
C2	1.002	1.662	2.665	-0.660	0.202
C3	1.505	1.172	2.677	0.332	0.203
C4	1.879	0.843	2.722	1.035	0.207
C5	1.233	1.260	2.492	-0.027	0.189

Table 8 demonstrates that C4 is the most influencing factor in the criterion set while C1 is the most influenced criteria among them. However, C4 is the most important criteria as C5 has relatively the weakest importance in the Ottoman waqfs. To compare the weighting results of the Waqfs, Fuzzy AHP method by considering Chang's extended method is applied in the second stage of the analysis. The averaged values of pairwise comparison matrix and the weighting results are illustrated in Table 9.

Table 9: Pairwise comparison matrix and the weighting results

	C1			C2			C3			C4			C5			Weights
C1	1.000	1.000	1.000	1.167	1.667	2.167	1.167	1.667	2.167	1.000	1.500	2.000	1.167	1.667	2.167	0.281
C2	0.462	0.600	0.857	1.000	1.000	1.000	1.167	1.667	2.167	1.000	1.500	2.000	1.167	1.667	2.167	0.240
C3	0.462	0.600	0.857	0.462	0.600	0.857	1.000	1.000	1.000	1.000	1.500	2.000	1.667	2.167	2.667	0.256
C4	0.500	0.667	1.000	0.500	0.667	1.000	0.500	0.667	1.000	1.000	1.000	1.000	1.667	2.167	2.667	0.182
C5	0.462	0.600	0.857	0.462	0.600	0.857	0.375	0.462	0.600	0.375	0.462	0.600	1.000	1.000	1.000	0.040

C1 is the most important function of waqfs by considering the hierarchical method with fuzzy AHP while C5 has the weakest importance among them. The comparative result demonstrates that the waqfs with the economic and financial priorities (C4) have the highest influences among them in Ottoman Economy when it is considered that each function has an impact on the others. However, if it is assumed that there is a hierarchical impact between them, C1 has the highest importance instead of C5 in the waqfs.

6. DISCUSSION AND CONCLUSION

In this study, it is aimed to evaluate the financial and nonfinancial functions of the waqfs in Ottoman economy. Within this scope, five different functions of the waqfs are defined by reviewing similar studies in the literature. These five functions are mainly related to the education, infrastructure, health, economic and financial and social. The importance of these functions is evaluated by using fuzzy DEMATEL methodology. In addition to this situation, fuzzy AHP approach is also taken into consideration in order to make a comparative analysis and see the appropriateness of the results.

According to the results of these methods, it is identified that fuzzy DEMATEL and fuzzy AHP methods give different results. With respect to the fuzzy DEMATEL, the findings show that economic and financial purpose is the most significant function of the waqfs for Ottoman economy. Additionally, it is also determined that infrastructure function of the waqfs has the least importance. On the other side, regarding fuzzy AHP, education is the most important function of the waqfs. This situation gives information that economic and financial function has the highest significance when each function is considered to have an effect on the others. However, if it is assumed that there is a hierarchical impact between these functions, education has the highest importance instead of economic and financial issues.

While considering the analysis results, it is recommended that countries should implement cash waqfs as an alternative financial model for economic system. The main reason behind this situation that these waqfs provide new opportunities to find sources for new investments. Since companies can make their investments much easily with the help of the waqfs, it can be said that these waqfs make also contribution to the economic development.

In this study, an important economic subject of the Ottoman Empire is examined. By understanding the details of the cash waqfs, many different lessons can be taken to improve today's economic conditions. Therefore, it can be said that this study makes a contribution to the literature. On the other side, a new study in the future which focuses on cash waqfs with other methodologies, such interval type-2 fuzzy logic will also be helpful.

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