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Prioritization of barriers to halal certification adoption for food SME: a study using Fuzzy Analytic Hierarchy Process

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ABSTRACT

Halal certification plays a crucial role in boosting Muslim consumer confidence and expanding both domestic and international market opportunities. However, small and medium enterprises (SMEs) often encounter significant challenges in obtaining this certification. This study explores the barriers faced by food SMEs in Malang Regency, Indonesia, in adopting halal certification and offers recommendations to address them. Using the fuzzy analytical hierarchy process (AHP) method, the study evaluates and ranks 20 identified barriers. The results show that the main obstacles are limited capital for certification registration, complicated registration process, and weak enforcement and compliance with the halal logo. This study emphasizes the importance of adopting halal certification for food SMEs to access the global market. The AHP approach proved effective in assessing the barriers hierarchically and systematically. Recommendations are provided to improve food SMEs' understanding of halal certification requirements to enhance product competitiveness in the international market.

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INTRODUCTION

Adopting halal certification in small and medium enterprises (SMEs) is essential to enhancing business competitiveness and credibility Nafis et al. (2024). Halal certification guarantees that products meet halal standards set by relevant authorities, which is crucial for Muslim consumers Gyenge et al. (2023). In Indonesia, where most of the population is Muslim, halal certification can increase consumer confidence in SME products Anggriani et al. (2024). Consumers are more likely to choose halal-certified products because they ensure they are free from haram ingredients and are produced according to high hygiene and safety principles Bux et al. (2022). In addition, halal certification opens opportunities for SMEs to expand domestic and international markets. The global market for halal products, which includes food, beverages, cosmetics, and pharmaceuticals, continues to increase Usmanova et al. (2022). With halal certification, SMEs can penetrate international markets, such as countries in the Middle East and Southeast Asia, which prioritize halal products. It increases revenue and opens up opportunities for collaboration and strategic partnerships Muhamed et al. (2023). In addition, halal certification encourages SMEs to improve product quality and production processes, which can improve operational efficiency and competitiveness. According to Giyanti and Indriastiningsih (2019) Over the past 5-10 years, there has been a significant increase in the number of food SMEs obtaining halal certification. However, for many small and medium enterprises, obtaining halal certification is too costly, pointing out that the adoption of halal certification can cost anywhere from IDR 1 million to IDR 10 million, depending on several variables such as the type of product and the halal certification body, limited resources are often a barrier for SMEs.

Identifying barriers to the adoption of halal certification is critical to ensure that SMEs can benefit from this certification. Without a clear understanding of the challenges, SMEs struggle to meet the requirements and standards for halal certification Oemar et al. (2022). These barriers can include high certification costs, lack of knowledge about the certification process, limited trained human resources, and complexity of regulations and requirements Santoso et al. (2021). By identifying these barriers, SMEs can design effective strategies to overcome them, such as seeking assistance from the government or relevant agencies, accessing training and mentoring programs, and optimizing existing resources Hassan et al. (2023). The identification of barriers also allows policymakers to formulate supportive policies and initiatives so that the halal certification process becomes more affordable and accessible to SMEs, which will ultimately improve the competitiveness and overall growth of the sector Oemar et al. (2022).

Several previous studies have utilized the Analytical Hierarchy Process (AHP) procedure to identify barriers to the adoption of halal certification in SMEs Sucipto et al. (2017). Although AHP can prioritize barriers based on importance, this traditional procedure faces limitations in handling information uncertainty Muhamad et al. (2023). AHP, while a powerful decision-making tool, cannot handle uncertain or vague information. Fuzzy AHP was developed to overcome these limitations, by incorporating fuzzy logic into the AHP framework. This allows decision-makers to work with imprecise, qualitative data, such as linguistic variables, and translate them into fuzzy numbers for a more flexible and accurate assessment. Fuzzy AHP thus offers a solution to the challenge of uncertainty in complex decision-making. The Fuzzy AHP procedure was developed to overcome these weaknesses and incorporate uncertainty information into decision-making. For example, Al-Mazeedi et al. (2013) examine the criteria that influence the selection of halal products, while Andarwati and Swalaganata (2023) use it to find promotional media for SMEs related to halal certification. Umami et al. (2023) applied Fuzzy AHP to evaluate suppliers based on food safety and halal criteria in the food industry. Azam (2016) uses this method to identify and select components of halal certification practices. In addition, Rusydiana et al. (2021) studied the development of green halal tourism. Rasli et al. (2015) identify non-technical barriers such as social perceptions, organizational culture, and market dynamics that also affect the adoption of halal certification.

Research on barriers to the adoption of halal certification in SMEs is still minimal. One of the relevant studies used AHP procedures. However, traditional AHP cannot accommodate uncertain information, thus reducing its decision-making accuracy. Although the Fuzzy AHP procedure is

effective in halal product-related decision applications, research using this method to evaluate barriers to halal certification does not yet exist. Therefore, this study aims to apply the Fuzzy AHP procedure in ranking barriers to halal certification adoption, which is expected to provide more accurate and relevant results in the context of information uncertainty. Thus, the main contribution of this research is to introduce a Fuzzy AHP approach to identify and prioritize barriers to the adoption of halal certification, therefore providing new insights that can assist SMEs in addressing halal certification challenges more effectively.

METHOD

Framework for proposing the ranking of the halal certification barriers

The framework of this proposed research follows the flowchart of the proposed method of procedure, as shown in Figure 1. This research starts with the first stage, collecting and identifying various barriers SMEs face in adopting halal certification. These barriers can be obtained from multiple sources, including academic literature, interviews with experts, surveys of SMEs, and case studies. The list of barriers identified in adopting halal certification is shown in Table 1. In the second stage, a pairwise comparison between the obstacles that have been identified is carried out. This pairwise comparison aims to determine the relative importance of each barrier in influencing SMEs' adoption of halal certification. The third stage involves processing the results of pairwise comparisons using the Fuzzy AHP method, which aims to rank these barriers based on their priority in the adoption of halal certification.

Meanwhile, in stages two and three, this research proposes the fuzzy AHP procedure developed by Chang (1996). This procedure was designed using the Analytical Hierarchy Process (AHP) method proposed by Saaty (1990). The Fuzzy AHP method effectively simplifies complex multi-criteria problems by dividing them into a more structured and systematic hierarchy. In contrast to classical AHP, Fuzzy AHP offers additional advantages, such as overcoming the limitations of classical methods by utilizing vague data (Yasa et al. 2021). In the context of this research, Fuzzy AHP is used to manage information uncertainty by converting linguistic variables into Triangular Fuzzy Numbers (TFN). This conversion process allows for a more flexible and accurate assessment, as described in Table 2.

The Fuzzy AHP stage begins with preparing a pairwise comparison matrix using linguistic variables converted to TFN (Amallynda et al. 2022, Santoso et al. 2023). This pairwise comparison matrix can be seen in Equation (1). Furthermore, the matrix operation in Equation (1) is performed according to the formulas in Equations (2) and (3), which apply to two fuzzy numbers $M_1 = (l_1, m_1, u_1)$ dan $M_2 = (l_2, m_2, u_2)$.

$$\bar{A} = \begin{bmatrix} 1 & \bar{a}_{12} & \dots & \bar{a}_{1n} \\ \bar{a}_{21} & 1 & \dots & \bar{a}_{2n} \\ \vdots & \vdots & \ddots & \vdots \\ \bar{a}_{n1} & \bar{a}_{n2} & \dots & 1 \end{bmatrix} \quad (1)$$

$$M_1 \oplus M_2 = (l_1, m_1, u_1) \oplus (l_2, m_2, u_2) = (l_1 + l_2, m_1 + m_2, u_1 + u_2) \quad (2)$$

$$M_1 \otimes M_2 = (l_1, m_1, u_1) \otimes (l_2, m_2, u_2) = (l_1 \, x \, l_2, m_1 \, x \, m_2, u_1 \, x \, u_2) \quad (3)$$

The next step is determining the fuzzy synthesis value (Si) shown in equation (4). $\sum_{j=1}^{m} M_{gi}^{j}$ represents the sum of the values in the columns of each matrix row, formulated in Equation (5). The TFN number is M, m denotes the number of indicators, and g describes the TFN parameters. To obtain the inverse of Equation (4), mathematical operations can be performed according to Equation (6):

$$Si = \sum_{j=1}^{m} M_{gi}^{j} \otimes \left[\sum_{i=1}^{n} \sum_{j=1}^{m} M_{gi}^{j}\right]\text{-}1 \quad (4)$$

$$\sum_{j=1}^{m} M_{gi}^{j} = \sum_{j=1}^{m} lj, \sum_{j=1}^{m} mj, \sum_{j=1}^{m} uj \quad (5)$$

$$\left[\sum_{i=1}^{n} \sum_{j=1}^{m} M_{gi}^{j}\right]^{-1} = \frac{1}{\sum_{j=1}^{m} uj, \sum_{j=1}^{m} mj, \sum_{j=1}^{m} lj} \quad (6)$$

The next step is to assign probability levels between fuzzy numbers for each indicator. For two TFN numbers, $M_1 = (l_1, m_1, u_1)$ and $M_2 = (l_2, m_2, u_2)$, a convex fuzzy number with a probability level $M_1 \geq M_2$ is formulated in equation (7).

$$(M_2 \geq M_1) = \begin{cases} 1; if \; m_2 \geq m_1 \\ 0; if \; l_1 \geq u_2 \\ \dfrac{l_1 - u_2}{(m_2 - u_2) - (m_1 - u_1)}; other \; condition \end{cases} \quad (7)$$

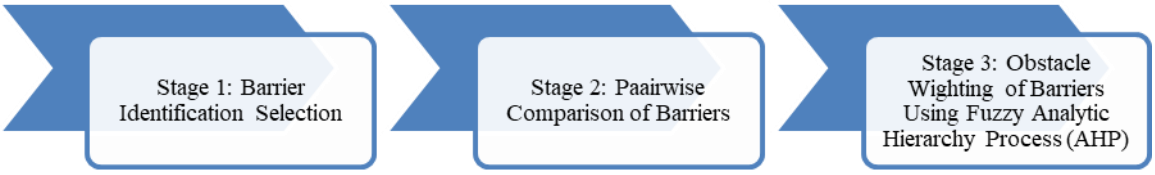

Figure 1 The research framework adopted in this study

Table 1 Barriers to adopting halal certification in food SMEs

No.	Barriers	References
B1	Lack of support from top management.	Prabowo et al. (2015)
B2	Weak enforcement and compliance of the halal logo.	Alhabshi (2013)
B3	Lack of consumer awareness in halal certification.	Usman et al. (2023)
B4	Lack of professionals in halal certification.	Zailani et al. (2015)
B5	Lack of infrastructure facilities for Halal products.	Rajagopal et al. (2011)
B6	Lack of clear understanding of halal issues and additives for halal products.	Ab Talib et al. (2013)
B7	Lack of research and development in the halal field for commercialization.	Haleem and Khan (2017)
B8	Lack of Government support in the creation and enforcement of halal-related norms.	Demirci et al. (2016)
B9	Lack of globally accepted halal certification bodies.	Al-Mazeedi et al. (2013)
B10	Lack of collaboration among various halal certification organizations.	Majid et al. (2015)
B11	Limited human resources (HR).	Tracey (2014)
B12	Reliance on government appeals.	Bennett and Robson (1999)
B13	Complicated enrollment process.	Noordin et al. (2014)
B14	Limited capital in registering for halal certification.	Yusuf et al. (2017)
B15	Supply chain limitations.	Arshad et al. (2018)
B16	Limited literacy about halal certification.	Ismail and Ibrahim (2011)
B17	Limitations of halal certification lab tests.	Ng et al. (2022)
B18	Limitations of the new and integrated NIB business identification number.	Anita et al. (2024)
B19	Limitations of halal certification services.	Haleem et al. (2020)
B20	Limited facilities and documents.	Mashalla et al. (2016)

The defuzzification judgment is modeled based on equation (8). Furthermore, assuming that$d'(A_i) = min\, V(S_i \geq S_k)$ to $k = 1,2,\dots,n : k \neq i$, the weight vector value is calculated using equation (9), and weight normalization is formulated in equation (10).

$$V(M \geq M_1, M_2, \dots, M_k) = V(M \geq M_1), V(M \geq M_2), \dots V(M \geq M_k) = (\min V\,(M \geq M_1), i = 1,2,\dots,k \quad (8)$$

$$W' = (d'(A_1), d'(A_2), \dots, d'(A_n))^T \quad (9)$$

$$W = (d(A_1), d(A_2), \dots, d(A_n))^T \quad (10)$$

The result of this stage is a weighting of barriers that indicates the top priorities that need to be addressed to facilitate SMEs' adoption of halal certification.

Data and Case Study

This research takes a case study of food SMEs in Malang Regency, East Java, Indonesia. Malang Regency was chosen because it is one of the regions in East Java with a significant level of halal food or culinary production and has great potential in the halal industry. This study involved

three experts: halal certification experts, SME owners, and academics, to identify barriers to halal certification adoption. This study involved a total of 20 respondents, comprising three experts in halal certification, five SME's owners, and seven academics specializing in food safety, halal regulations, and business management. The respondents were selected to provide a well-rounded perspective on the barriers to halal certification adoption. The experts had extensive experience in halal certification processes, while the SME owners had firsthand knowledge of the challenges, they faced in obtaining certification. The academics provided theoretical insights based on their research in halal food and SME development. They conducted a discussion group forum to compare the barriers identified pairwise, as presented in Table 1. The results of this pairwise comparison is presented in Table 3, which provides insight into the prioritization of obstacles based on the experts' views.

RESULT AND DISCUSSION

The research results on assessing barriers to adopting halal certification using the Fuzzy AHP method are presented in Table 4. The analysis shows that obstacle B14, namely "Listed capital in registering for halal certification," has the highest weight of 0.0813, indicating that high costs or lack of funds are the main factors that hinder businesses in obtaining halal certification. A detailed analysis of each major obstacle shows that the identified barriers align with real-world challenges faced by SMEs in the field. For instance, the barrier of 'Limited capital in registering for halal certification' (B14) is consistent with field reports, where SMEs report financial constraints as one of the top reasons for not pursuing certification. Additionally, the bureaucratic complexity identified in 'Complicated registration process' (B13) matches the experiences of many SME owners, who describe the certification process as too complex and time-consuming. Supporting data from industry reports and previous research confirm that these barriers are indeed significant, and the findings of this study are in line with real-world conditions. Research conducted by Mohamed et al. (2008) stated that producing halal food is very important because it can increase consumer confidence in the halalness, cleanliness, and feasibility of products for consumption or use. Obstacle B13, namely "Complicated registration process," also shows a significant weight of 0.0781. This indicates that the bureaucratic complexity and registration procedures involving many documents, and a complex verification process are essential barriers. In addition, bottleneck B2, "Weak enforcement and compliance with the halal logo," weighs 0.0769, indicating that the lack of enforcement and compliance with the halal logo is also a significant constraint. According to Tieman et al. (2013) co-research, complicated registration is often a significant barrier for manufacturers adopting halal certification. Meanwhile, B2 refers to weak enforcement and compliance with the halal logo, such as the lack of commitment from the halal logo and enforcement in managing the halal logo.

Table 2 Linguistic Variables and Triangular Fuzzy Number Fuzzy AHP

Variable Lingusitik (VL)	Code VL	Triangular Fuzzy Numbers	Reciprocal
Both elements are Equal Important	EI	(1; 1; 1)	(1; 1; 1)
Element one Intermediate Preference	IP	(1; 2; 3)	(1/3; 1/2; 1)
Element one Moderately More Important	MI	(2; 3; 4)	(1/4; 1/3; 1/2)
Element one Intermediate Preference	IR	(3; 4; 5)	(1/5; 1/4; 1/3)
Element one Strongly More Important	SI	(4; 5; 6)	(1/6; 1/5; 1/4)
Element one Intermediate Preference	IF	(5; 6; 7)	(1/7; 1/6; 1/5)
Element one Very Strong More Important	VI	(6; 7; 8)	(1/8; 1/7; 1/6)

Table 3 Pairwise comparison of barriers to the adoption of halal certification in food SME's

Barriers	14	13	2	6	8	9	11	12	16	18	20	1	3	5	7	10	15	17	9	4
B14	1	(2, 3, 4)	(1, 2, 3)	(1, 2, 3)	(1, 2, 3)	(1, 2, 3)	(1, 2, 3)	(1, 2, 3)	(1, 2, 3)	(1, 2, 3)	(2, 3, 4)	(2, 3, 4)	(2, 3, 4)	(2, 3, 4)	(2, 3, 4)	(2, 3, 4)	(2, 3, 4)	(1, 2, 3)	(1, 2, 3)	(1, 2, 3)
B13		1	(2, 3, 4)	(1, 2, 3)	(2, 3, 4)	(2, 3, 4)	(2, 3, 4)	(2, 3, 4)	(2, 3, 4)	(2, 3, 4)	(2, 3, 4)	(1, 2, 3)	(2, 3, 4)	(2, 3, 4)	(2, 3, 4)	(2, 3, 4)	(1, 2, 3)	(1, 2, 3)	(2, 3, 4)	(2, 3, 4)
B2			1	(2, 3, 4)	(1, 2, 3)	(1, 2, 3)	(2, 3, 4)	(2, 3, 4)	(2, 3, 4)	(2, 3, 4)	(2, 3, 4)	(2, 3, 4)	(2, 3, 4)	(1, 2, 3)	(1, 2, 3)	(2, 3, 4)	(2, 3, 4)	(1, 2, 3)	(2, 3, 4)	(1, 2, 3)
B6				1	(2, 3, 4)	(1, 2, 3)	(2, 3, 4)	(2, 3, 4)	(2, 3, 4)	(2, 3, 4)	(2, 3, 4)	(3, 4, 5)	(2, 3, 4)	(2, 3, 4)	(2, 3, 4)	(2, 3, 4)	(1, 2, 3)	(2, 3, 4)	(2, 3, 4)	(1, 2, 3)
B8					1	(2, 3, 4)	(1, 2, 3)	(1, 2, 3)	(2, 3, 4)	(2, 3, 4)	(2, 3, 4)	(2, 3, 4)	(2, 3, 4)	(3, 4, 5)	(3, 4, 5)	(2, 3, 4)	(2, 3, 4)	(1, 2, 3)	(1, 2, 3)	(2, 3, 4)
B9						1	(1, 2, 3)	(1, 2, 3)	(1, 2, 3)	(2, 3, 4)	(2, 3, 4)	(2, 3, 4)	(2, 3, 4)	(2, 3, 4)	(2, 3, 4)	(2, 3, 4)	(1, 2, 3)	(1, 2, 3)	(1, 2, 3)	(2, 3, 4)
B11							1	(2, 3, 4)	(1, 2, 3)	(2, 3, 4)	(2, 3, 4)	(1, 2, 3)	(1, 2, 3)	(1, 2, 3)	(2, 3, 4)	(2, 3, 4)	(2, 3, 4)	(1, 2, 3)	(1, 2, 3)	(2, 3, 4)
B12								1	(2, 3, 4)	(2, 3, 4)	(1, 2, 3)	(2, 3, 4)	(1, 2, 3)	(2, 3, 4)	(1, 2, 3)	(1, 2, 3)	(2, 3, 4)	(1, 2, 3)	(1, 2, 3)	(2, 3, 4)
B16									1	(2, 3, 4)	(2, 3, 4)	(2, 3, 4)	(2, 3, 4)	(2, 3, 4)	(1, 2, 3)	(2, 3, 4)	(2, 3, 4)	(2, 3, 4)	(1, 2, 3)	(2, 3, 4)
B18										1	(3, 4, 5)	(2, 3, 4)	(3, 4, 5)	(2, 3, 4)	(2, 3, 4)	(3, 4, 5)	(2, 3, 4)	(2, 3, 4)	(1, 2, 3)	(1, 2, 3)
B20											1	(2, 3, 4)	(2, 3, 4)	(2, 3, 4)	(2, 3, 4)	(2, 3, 4)	(1, 2, 3)	(2, 3, 4)	(1, 2, 3)	(1, 2, 3)
B1												1	(2, 3, 4)	(2, 3, 4)	(2, 3, 4)	(2, 3, 4)	(1, 2, 3)	(2, 3, 4)	(2, 3, 4)	(1, 2, 3)
B3													1	(2, 3, 4)	(2, 3, 4)	(2, 3, 4)	(2, 3, 4)	(2, 3, 4)	(2, 3, 4)	(1, 2, 3)
B5														1	(2, 3, 4)	(2, 3, 4)	(2, 3, 4)	(2, 3, 4)	(2, 3, 4)	(2, 3, 4)
B7															1	(2, 3, 4)	(2, 3, 4)	(1, 2, 3)	(1, 2, 3)	(1, 2, 3)
B10																1	(2, 3, 4)	(2, 3, 4)	(1, 2, 3)	(1, 2, 3)
B15																	1	(2, 3, 4)	(2, 3, 4)	(2, 3, 4)
B17																		1	(1, 2, 3)	(1, 2, 3)
B19																			1	(2, 3, 4)
B4																				1

Table 4 Weighting Results of Barriers to Halal Certification Adoption in Food SME's

Code	Barriers	Weight
B14	Listed capital in registering for halal certification.	0.0813
B13	Complicated enrollment process.	0.0781
B2	Weak enforcement and compliance with halal logos.	0.0769
B6	Lack of clear understanding of halal issues and additives for halal products.	0.0766
B8	Lack of government support in the creation and enforcement of halal-related norms.	0.0752
B9	Lack of globally accepted halal certification bodies.	0.0676
B11	Listed human resources (HR).	0.064
B12	Reliance on government appeals.	0.0624
B16	Listed literacy about halal certification.	0.062
B18	Listations of the new and integrated business identification number (NIB).	0.0605
B20	Listed facilities and documents.	0.0523
B1	Lack of support from top management.	0.0479
B3	Lack of consumer awareness in halal certification.	0.0461
B5	Lack of infrastructure facilities for halal products.	0.043
B7	Lack of research and development in the halal field for commercialization.	0.0324
B10	Lack of collaboration among various halal certification organizations.	0.0257
B15	Supply chain li3tations.	0.0203
B17	Listations of halal certification lab tests.	0.0139
B19	Listations of halal certification services.	0.0121
B4	Lack of professionals in halal certification.	0.0015

Barriers B6, B8, and B9, with weights of 0.0766, 0.0752, and 0.0676, respectively, indicate a considerable influence on the halal certification adoption process. Obstacle B6 may include a lack of clear understanding of halal issues and additives for halal products. It is supported by Ali et al. (2022) research on the importance of additives in the halal supply chain. Obstacle B8 includes the lack of Government support in creating and enforcing halal-related norms. Bottleneck B9 may refer to the lack of globally accepted halal certification bodies.

In contrast, bottleneck B17, "Listations of halal certification laboratory tests," has a relatively low weight of 0.0139, indicating that this is not a significant factor hindering the certification process. However, the lack of accredited testing facilities may affect the process. Obstacle B19, "Listed Halal certification services," also shows a low weight of 0.0121, indicating that inefficient services in halal certification are a minor problem. Finally, bottleneck B4, "Lack of professionals in halal certification," has the lowest weight of 0.0015, indicating that the shortage of trained professionals in halal certification is the least of the bottlenecks. Research by Talib et al. (2015) shows that adequate training and knowledge are essential to ensure successful halal implementation in logistics operations. This report provides insights to increase manufacturers' awareness and readiness by highlighting the main obstacles to SMEs' adoption of halal certification. The results back up the creation of guidelines and tactics to increase SMEs' acceptance of halal certification.

Theoretical Implications

This research provides significant theoretical implications for understanding halal certification adoption in the context of the supply chain. Using the Fuzzy AHP method, this research enriches the literature on assessing barriers to halal supply chain adoption with a more flexible approach in the face of uncertainty and subjectivity. The

results show that barriers related to cost and bureaucratic complexity are the main factors hindering adoption. In contrast, barriers such as Listed laboratory testing facilities and certification services are considered less significant. These findings support theories that underline the importance of financial and administrative aspects in adopting international standards. In addition, this study confirms that introducing the Fuzzy AHP method in barrier analysis can provide a more precise and more profound picture of barrier prioritization, thus expanding the applicability of AHP theory in a more complex and dynamic context.

Managerial Implications and Recommendations

The results of this study provide critical managerial implications for businesses and policymakers in the food SME sector. The finding that the main barriers to the adoption of halal certification are Listed capital and a complicated registration process suggests that firms need to strengthen their financial planning to cover the high certification costs and manage the complex bureaucratic process. Therefore, it is recommended that SME managers set aside a dedicated budget for halal certification and establish partnerships with support institutions for financial assistance or consultancy. In addition, to address bureaucratic barriers, it is recommended that the registration process be clarified and streamlined through digitization and the development of more transparent procedures. Furthermore, given barriers such as weak enforcement and compliance with halal logos, companies must improve internal understanding and compliance with halal standards. Employee training and the implementation of effective monitoring systems can help ensure that all aspects of production and distribution comply with halal standards. Although barriers such as Listed laboratory testing facilities and certification services are considered less significant, there is still a need to improve the quality and efficiency of these services to support the certification process.

CONCLUSION

This study successfully proposes the Fuzzy AHP procedure as a tool to provide a prioritized assessment of barriers to the adoption of halal certification for SMEs in the food industry. To overcome the barriers to halal certification adoption, it is recommended that SMEs prioritize budgeting for certification costs and seek financial support from government programs or industry partnerships. Streamlining the registration process through digitization and clearer guidelines can help reduce bureaucratic obstacles. Additionally, SME's managers should invest in employee training to ensure compliance with halal standards and strengthen internal understanding of the certification requirements. Policymakers should also focus on making halal certification more affordable and accessible to SMEs by introducing subsidy programs and simplifying the process. The results identified that the main obstacles SMEs face in adopting halal certification are Limited capital for registration, complicated registration process, and lack of understanding and awareness regarding the importance of halal certification. Nonetheless, this study has limitations, including the Listed number of samples and the survey scope, which covers only the Malang Regency area. A broader study involving more SMEs from different regions and sectors is recommended for future research to confirm these findings and identify additional possible barriers. In addition, further research could also explore effective strategies to overcome these barriers and increase the adoption rate of halal certification among SMEs.

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