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The Impact of Formal Authorization and Halal Education on Effective non-Conformity Management in the Halal Food Industry

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ABSTRACT

This paper presents the results of a study examining the impact of employees' formal authorization and halal education on the effectiveness of non-conformity management in the implementation of halal standards within the food industry of Bosnia and Herzegovina. The study is based on the assumption that the formal authorization of halal-competent employees, operationalized through membership in a halal team, positively influences an organization's ability to identify and effectively address deviations from halal standard requirements in a timely manner. The methodological framework employed a survey research design conducted on a sample of 150 employees from 44 halal-certified food companies in Bosnia and Herzegovina. Data were analyzed using independent-samples t-tests and analysis of variance (ANOVA). The results indicate a statistically significant positive difference in the mean evaluation of non-conformity management effectiveness between employees who possess formal authorization and those who do not. The analysis further explored the effect of formal halal education, which was also found to have a statistically significant positive impact, although of a smaller magnitude. In addition, significant differences in perceived effectiveness were observed across job positions, with quality managers reporting higher effectiveness evaluations than production employees. Overall, the findings clearly demonstrate that formal authorization represents a key factor contributing to higher perceived effectiveness of non-conformity management systems. The study offers practical recommendations for improving existing practices, including the extension of formal authorization and targeted education to all employees involved in the halal production chain, with particular emphasis on operational staff.

Keywords: formal authorization; halal education; non-conformity management; halal quality; Bosnia and Herzegovina

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This study provides a new empirical insight based on data collected as a part of the author's master's research at the Faculty of Economics, University of Tuzla (defended in October 2025), which were not analyzed within the scope of the master's thesis.

INTRODUCTION

The global halal industry is experiencing dynamic growth and significant expansion of its normative and regulatory scope, evolving from a primarily religious compliance framework toward management and quality assurance-oriented systems. This evolutionary progression has been manifested through the standardization of certification processes, as reflected in halal standards such as BAS 1049:2023 and SMIIC 18:2021, which define requirements for product compliance across the entire halal value chain “from farm to consumer” and for the establishment of a halal quality management system (HQMS). However, standards alone do not guarantee the effective implementation of halal requirements, as achieving effectiveness depends on the consistent execution of specific procedures, including internal audits and non-conformity management (NCM).

In an effective HQMS, the internal audit serves as a mechanism for the systematic monitoring of implemented requirements and the identification of deviations from standards, which in turn inform and guide NCM. By definition, a non-conformity (NC) represents a deviation from prescribed norms (ISO, n.d.), which, if not detected and corrected in a timely manner, may undermine halal integrity, erode consumer trust, and jeopardize market position.

Non-conformity management is a core component of the quality management system, whose effectiveness relies not only on technical procedures but also on the human factor. Halal standards require responsible personnel, such as internal auditors, to be formally appointed and adequately qualified and trained. These requirements are commonly addressed through a quality manual, which outlines general provisions for policy implementation, quality objectives, and the authority and responsibilities of different management levels and quality managers (Umihanić et al., 2013).

Accordingly, this study focuses on the role of employees’ *formal authorization*, operationalized as membership in a formal halal team, in order to examine its relationship with the perceived effectiveness of non-conformity management. Guided by this focus, the central

research question is formulated as follows: *Is there a statistically significant difference in the perception of non-conformity management effectiveness in the halal food industry between employees with formal authorization and those without it?* To address this research question, the empirical analysis draws on data collected from halal-certified food companies operating in Bosnia and Herzegovina.

Halal certification in Bosnia and Herzegovina is based on the standard BAS 1049:2023 – Halal Food, Requirements and Measures, while the halal quality management system relies on SMIIC 18:2021 (HQMS). Both standards recognize the central role of employees by emphasizing training and the formal appointment of responsible personnel (e.g., internal halal auditors) with clearly defined authorities and responsibilities (SMIIC 18, clauses 7.2 and 7.3) as key mechanisms for halal quality assurance. Within this regulatory and organizational framework, the term *halal context* is used to encompass the broader setting in which halal requirements are implemented. It includes all organizational aspects, business functions, and practices grounded in halal principles and standards. In the literature, this domain is also referred to as the *Islamic economy* (Dinar Standard, 2019), *halal industry* (International Trade Centre, 2015), *halal economy* or *halalonomy* (Hodžić, 2022), and the *halal ecosystem*, denoting an institutional and operationally networked system of actors, processes, and norms for the implementation of halal requirements (Noordin et al., 2014).

This paper provides a structured discussion, with chapters One and Two focusing on the key variables — formal authorization and non-conformity management within the halal context. Chapter Three examines the contribution of halal training to effective non-conformity management, while chapters Four and Five present the research methodology, the formulated hypotheses, and the analysis of the collected data. The final chapter provides a discussion and conclusions, followed by recommendations for practice and future research.

1. FORMAL AUTHORIZATION FOR NON-CONFORMITY MANAGEMENT IN THE HALAL CONTEXT

Halal quality standards explicitly define management obligations regarding the appointment of competent personnel and the establishment of internal control mechanisms to ensure the consistent application of halal principles. To capture these requirements at the organizational level, this study conceptualizes *formal authorisation* as an analytical construct that encompasses the formal appointment of employees to specific roles and the assignment of corresponding authorities required for effective halal quality management.

Within this framework, the *formal authorization* denotes a documented appointment that assigns individuals to specific halal roles and grants them explicit operational, decision-making, and reporting authority necessary for the effective management of non-conformities in halal standard implementation. While halal standards such as BAS 1049:2023, OIC/SMIIC 18:2021 and ISO/IEC 17065:2012 refer to the act of *appointment* or *assignment* (e.g., shall appoint, shall assign), the *formal authorization* extends this notion by encompassing *the authority and responsibilities to act independently and ensure compliance*.

In halal context, formal authorization primarily relates to the appointment of members of the halal team, particularly *internal halal quality auditors*. This approach enables a clear distinction between an employee's job position and the explicit delegation of authority within the quality management system, which constitutes a fundamental requirement of relevant halal standards.

The concept of formal authorization is implicitly embedded in the requirements of numerous standards, including OIC/SMIIC 1:2019, OIC/SMIIC 18:2021, ISO/IEC 17065:2012, BAS 1049:2023 and HACCP guidelines. Based on these requirements, three key dimensions were identified and systematized as prerequisites for comprehensive formal authorization:

- **Formal appointment through a written document** that explicitly assigns an individual to specific halal-related roles (e.g., “internal halal auditor”), defines

its scope of work, responsibilities, and authorities in relation to implemented halal standard, and ensures that this appointment is communicated to all relevant organizational units.

- **Operational authority for action and decision-making**, enabling the authorized individual to access all quality management system documentation and production facilities without additional approval. This authority also includes the issuance of corrective action requests (CARs), monitoring their implementation, and, where necessary, suspending production in cases of critical non-conformity.
- **Authorization for reporting and communication of findings** (e.g., audit reports), which are submitted directly to senior management, along with responsibility for monitoring the implementation of recommended corrective measures.

Formal authorization is conceptually aligned with employee participation, a key component of contemporary human resource management (HRM) practices. At the fundamental level, participation refers to the degree of employee involvement in decision-making processes, implying that employees are empowered to contribute – through their knowledge, experience, and initiative – to performance improvement and the achievement of organizational objectives (Bahtijarević-Šiber, 1999). Similarly, Self-Determination Theory emphasizes employee autonomy as a central predictor of engagement and work effectiveness (Ryan & Deci, 2020). In this sense, participation represents a managerial instrument as well as a value-based dimension that promotes active contribution of employees.

Each working position related to quality management shall get appropriate authority to ensure the achievement of organizational objectives concerning quality and compliance, whether the role involves a quality manager, a production supervisor, or a quality control employee. It is important to note that these positions do not necessarily entail responsibility for the entire quality management system but

may relate to one or more partial management systems (Alić, 2010). For example, an individual responsible for ISO standards, hygiene, or health requirements may not necessarily be responsible for halal compliance.

Employee involvement and formal authorization are anchored in the requirements of international standards, such as ISO 9001:2015 (Clause 5.3), which requires top management to ensure (shall) that the responsibilities and authorities for relevant roles are assigned, communicated, and understood within the organization. Similarly, halal standards BAS 1049:2023 (Clause 11.4) and SMIC 18:2021 (Clause 9.2) require the internal halal audit to be established as a documented procedure and mandatory mechanism for supervision, evaluation, and improvement.

Furthermore, a specific form of appointment is also applied in the work of certification bodies, which, in accordance with the provisions of ISO 19011:2018 (Clause 5.4 and Clause 7), shall ensure that auditors are competent, appropriately selected, and formally assigned responsibilities within the audit programme.

The distinctive nature of appointing responsible personnel and assigning authority in the halal context stems from the fact that it extends beyond technical competence to encompass moral responsibility and personal integrity. Halal auditors are required to possess knowledge of Shariah requirements and to demonstrate consistency with Islamic values (Dz & Nurhayati, 2019). In addition to meeting technical requirements, halal certification entails continuous involvement of employees in internal control, training, and the implementation of Good Manufacturing Practices (GMP), thereby contributing to process integrity (Razalli et al., 2016).

Based on these considerations, formal authorization may be regarded as a significant human resource management practice, as it ensures that individuals within the organization possess the necessary knowledge and skills, as well as the authority and legitimacy to act if deviation from standards occurs. Formal authorization and employee competence are critical for effective non-conformity management reflected in the timeliness and

adequacy of corrective actions. Both dimensions depend on whether employees are granted a clear mandate to act.

An employee without formal authorization may identify a non-conformity but must obtain approval from an authorized person before taking action, thereby prolonging response time and increasing the risk to halal product integrity. By contrast, a formally authorized member of the halal team has both the right and obligation to respond immediately, initiate corrective action, and report implemented measures to management. This approach ensures that formal authorization transcends mere administrative compliance and functions as a strategic management tool for strengthening consumer trust and safeguarding the credibility of halal certification (Jašić et al., 2022b).

2. NON-CONFORMITY MANAGEMENT IN THE IMPLEMENTATION OF HALAL STANDARDS

Effective non-conformity management (NCM) represents a critical risk control mechanism and constitutes a core element of quality management systems. In the context of this study, effective non-conformity management refers to an organization's ability to systematically and timely identify, document, analyze, and eliminate deviations from halal standard requirements, as well as to prevent their recurrence through the establishment of appropriate corrective and preventive mechanisms. Within the halal industry, such mechanisms are particularly critical due to the pronounced risks to product integrity and consumer trust.

According to ISO, a non-conformity is defined as the "non-fulfilment of a requirement" (ISO, n.d.). In the halal context, this term refers specifically to deviations from defined criteria related to prohibition (*haram*), quality (*tayyib*), purity, and the avoidance of contamination in raw materials, products, processes, or employee practices. This characteristic of the halal context implies that even minor deviations may have serious consequences for halal product integrity, thereby elevating non-conformity management from a purely operational procedure to a strategic organizational process.

The Halal Quality Management System (HQMS) is compatible with the fundamental principles of quality management systems (QMS), including customer focus, leadership, engagement of people, process approach, system approach to management, continual improvement, evidence-based decision-making, and mutually beneficial supplier relationships (Umihanić et al., 2013). In this study, the process approach is emphasized as a fundamental dimension of the HQMS, as it forms the backbone of rational and standardized operational execution and enables the systematic monitoring and optimization of processes (Natsir et al., 2024; Rehmani et al., 2020). Internal control and auditing, in combination with non-conformity management mechanisms, enable organizations to continuously assess compliance with applicable standards and initiate corrective actions, while customer satisfaction serves as an external indicator of overall system effectiveness (Othman et al., 2019; Rehmani et al., 2020).

Non-conformity management is a concept that derives directly from the requirements of relevant halal standards. In BAS 1049:2023, it is addressed in the chapters on Preventive and Corrective Measures (Clause 11.5) and Identification and Traceability (Clause 11.7), while in SMIIC 18:2021 it is systematized through requirements related to corrective actions and continual improvement (Clauses 10.2 and 10.3). Both BAS 1049:2023 and SMIIC 18:2021 explicitly require organizations to establish, implement, and maintain a documented process for non-conformity management, including identification, control, and corrective action.

SMIIC 18:2021 (Clause 8.7.1) further stipulates that, when a non-conformity is identified, organizations shall undertake one or more of the following actions: corrective action, segregation, isolation, withdrawal or recall of products from the market, customer notification, and, where necessary, notification of relevant authorities and certification bodies. The primary purpose of these measures is to prevent the unintended release and use of non-conforming products.

According to Jašić et al. (2022), a **critical non-conformity** with halal standard requirements

occurs when an action, activity, procedure, or the use of raw materials directly compromises the halal status of a product, effectively rendering it *haram*. Similarly, a **minor non-conformity** refers to cases in which a process or its segment, activity, or use of raw materials that does not fully comply with halal standard requirements but does not affect the halal status of the product (Jašić et al., 2022a).

Given the potentially severe consequences of both, critical and minor non-conformities for halal product integrity, effective non-conformity management in this study is operationalized through two key dimensions:

1. **Speed and timeliness of non-conformity identification** – measured as the time elapsed between the occurrence of a non-conformity and its detection. Timely identification is critical, as delayed detection may have severe consequences for the integrity of halal products or services.
2. **Effectiveness of corrective actions** – referring to the extent to which the corrective measures are adequate and effective. This dimension is directly linked to halal standard requirements concerning the implementation of corrective actions and the verification or validation of their effectiveness.

The processes of identifying, analyzing, and eliminating non-conformities should be implemented as organizational measures operating within systems where responsibilities and authorities are clearly defined and explicitly assigned through formal authorization, rather than being left to individual initiative. Such an approach establishes a positive association between the formal delegation of authority and the effectiveness of non-conformity management. Under these conditions, formal authorization functions not merely as an administrative arrangement but as a strategic instrument that connects the human factor with quality system mechanisms and the specific requirements of halal standards.

Effective non-conformity management performs a preventive function through root cause analysis and the continual improvement of procedures,

in accordance with SMIIC 18:2021 (Clause 10.3). Through this function, it contributes to enhanced organizational effectiveness and resilience to errors, thereby supporting the long-term integrity and credibility of halal certification.

3. THE ROLE OF HALAL EDUCATION IN NON-CONFORMITY MANAGEMENT

The preceding chapters have outlined the theoretical overview of formal authorization and non-conformity management, as well as the elements linking these two aspects into a unified mechanism. It has been emphasized that the effectiveness of non-conformity management systems in the halal context depends not only on formal authorization but equally on the competencies of employees who understand and consistently apply these mechanisms in everyday practice. This perspective further highlights the role of halal education as a critical component and a strategic approach to human resource development aimed at safeguarding halal integrity.

Halal standards explicitly require that personnel, whose activities may affect the halal status of products or processes, possess appropriate competencies acquired through education, training, or relevant experience (BAS 1049:2023, Clause 11.2; SMIIC 18:2021, Clause 7.2). This requirement reflects the understanding that human capital aligned with halal principles, represents a valuable, rare, and difficult-to-imitate resource that contributes to sustainable organizational effectiveness (Lado & Wilson, 1994).

Accordingly, halal standards conceptualize education as a systematic process rather as a one-time or ad hoc activity, requiring it to be planned, documented, and evaluated in accordance with the objectives of the halal quality management system (Alić & Hadžić, 2022). In the context of non-conformity management, educational programs should, therefore, focus on developing employees' specific capacities for the timely identification of deviations, their proper documentation, and the initiation and monitoring of corrective actions. These capacities can be analytically examined through competency-

based models, such as the framework proposed by The Peak Performance Center (2025), which conceptualizes competencies as a combination of *knowledge, attitudes, skills, and habits* (KSAH/KASH). This competency-based approach enables a holistic understanding of the competencies expected of employees within the halal system, as it addresses behavioral competencies alongside technical ones.

When KSAH/KASH approach applied to the halal competency framework, **knowledge** refers to an understanding of the Shariah foundations of halal, the technical requirements of relevant halal standards, and potential causes of non-conformities within specific production processes. A lack of such knowledge has been identified in the literature as one of the key barriers to the effective implementation of halal requirements (Harwati & Sopha, 2024; Talib et al., 2015). **Skills** encompass the practical capacity to apply halal-related knowledge, including the ability to recognize non-conformities, conduct root causes analysis, and perform accurate reporting and communication of findings.

Attitudes constitute the value-based behavioural dimension of halal competences and reflect an ethical sensitivity, sense of personal responsibility, and intrinsic motivation including religiosity (Adnan et al., 2019; Yousef, 2000) of employees to safeguard halal integrity. This dimension is essential for moving beyond passive compliance with procedures toward proactive engagement and initiative in preventing errors (Dz & Nurhayati, 2019). Work **habits** represent the another behavioural dimension of halal competencies, reflected in the consistent and reliable performance of prescribed checks, controls, and procedures as part of routine practice, without excessive effort or reliance on external prompting or supervision. Education and formal authorization are interdependent functions and serve as complementary and synergistic factors within the non-conformity management system. An educated employee without appropriate formal authorization may understand required actions but lacks the legitimacy and authority to intervene promptly. By contrast, an employee with formal authorization but without adequate

education may face limitation in judgment, potentially resulting in inappropriate or ineffective responses to identified non-conformities.

Formal halal education operates on at least two interrelated levels that directly contribute to the effectiveness of non-conformity management. First, education enhances individual employee effectiveness and motivation. According to Self-Determination Theory, knowledge and developed skills satisfy the psychological need for competence, resulting in greater confidence and an increased capacity to recognize problems, report them, and actively participate in their resolution (Ryan & Deci, 2020). This sense of competence reinforces autonomy and intrinsic motivation, which is directly reflected in the speed and timeliness of non-conformity identification. Second, continuous education contributes to the development of organizational halal awareness as a shared value framework and a common understanding of the importance of halal integrity across all organizational levels. Razalli et al. (2016) emphasize that organizational effectiveness depends on employees' knowledge and skills in developing and delivering services. Accordingly, by developing specific knowledge, skills, attitudes, and habits, education directly enhances the effectiveness of non-conformity management through faster detection and effective corrective actions. This theoretical framework leads to conclusion that employees who have undergone relevant education will possess deeper insight into working system and procedures, greater capability to implement them, and a higher perceived effectiveness of the overall non-conformity management process compared to their non-trained counterparts. Consequently, formal halal education constitutes a fundamental prerequisite for the professional, responsible, and effective use of delegated authority in practice.

4. RESEARCH METHODOLOGY

4.1. Dimensions and Indicators of Formal Authorization

The empirical analysis of formal authorization was conducted using data collected through a

structured survey administered to employees of halal-certified food companies in Bosnia and Herzegovina. The study examined indicators related to respondents' job position and their formal membership in a halal team responsible for implementing, supervising, and improving halal quality assurance activities. In this research, formal authorization was operationalized through membership in a formally established halal team, which presupposes the simultaneous fulfilment of three essential criteria: **formal appointment**, **operational decision-making authority**, and **authorization for reporting**.

Based on responses to the survey item "*I am a member of a formal (halal) team responsible for supervising and improving halal practices,*" with binary response options (*Yes/No*), respondents were classified into two groups:

- **Group 1 – Formally authorized employees:** respondents who answered *Yes* (members of the halal team).
- **Group 2 – Employees without formal authorization:** respondents who answered *No*.

This dichotomous classification was used as the independent variable (X) in the statistical analysis.

This approach, grounded in explicit formal appointment, is fully consistent with the requirements of halal standards and provides a clear basis for assessing the effect of formal authorization on the perceived system effectiveness. Furthermore, the analysis was extended to identify differences in perceptions across functional positions, specifically among quality managers, quality control staff, and production employees.

4.2. Dimensions and Indicators of Effective Non-Conformity Management

Effective non-conformity management, operationalized as the dependent variable (Y) in this study, was measured using a five-point Likert scale (1 = *strongly disagree*, 5 = *strongly agree*). The measurement instrument captured two primary dimensions:

- **Speed of identification:** "*Non-conformities with halal standards are*

identified immediately after they occur.”

- **Effectiveness of corrective actions:** *“Corrective actions implemented following the identification of non-conformities are effective and timely.”*

For each respondent, the overall score for the variable *Effective Non-Conformity Management* was calculated as the mean value of the two related items – the speed of detection and the effectiveness of corrective actions. Higher mean scores indicate a more favorable perception of non-conformity management effectiveness within the organization.

4.3. Research Objectives and Hypotheses

The primary objective of this study is to examine the **effect of formal authorization**, operationalized through membership in a halal team, on employees' evaluations of non-conformity management in halal-certified food companies in Bosnia and Herzegovina. In addition, the study seeks to **assess the impact of formal halal education** on employees' perceptions of non-conformity management effectiveness.

Accordingly, the following hypotheses were formulated:

- **H1:** There is a statistically significant positive difference in the mean evaluation of non-conformity management effectiveness between employees who possess formal authorization as members of a halal team and employees without such authorization
- **H2:** There is a statistically significant positive difference in the mean evaluation of non-conformity management effectiveness between employees who have completed formal halal education and those who have not.
- **H3:** There is a statistically significant difference in the mean evaluation of non-conformity management effectiveness among quality managers, quality control staff, and production employees.

4.4. Methods of Analysis

The analytical sample consisted of employees from halal-certified food companies in Bosnia

and Herzegovina (N = 150), distributed across three occupational categories: quality managers (N = 41), quality control staff (N = 31), and production employees (N = 78).

To test Hypotheses H1 and H2, **independent-samples t-tests** were conducted to compare mean values of the dependent variable (*Y – evaluation of non-conformity management effectiveness*) between two independent groups defined by dichotomous variables (*X1 – formally authorized / not authorized; X2 – educated / not educated*).

To test hypothesis H3 and further explore differences across functional groups, a **one-way analysis of variance (ANOVA)** was performed, with job position serving as the grouping factor. Prior to performing the ANOVA, relevant statistical assumptions were examined. When statistically significant differences were found, the **Tukey HSD post-hoc test** was applied to determine pairwise group differences.

5. RESULTS OF THE ANALYSIS

5.1. Reliability Analysis of the Measurement Instrument

To assess the reliability of the scale used to measure perceived effectiveness of non-conformity management, the **Pearson correlation coefficient** was calculated between the two items constituting the construct:

- **Item 1:** *“Non-conformities with halal standards are identified immediately after they occur.”*
- **Item 2:** *“Corrective actions taken after the identification of non-conformities are effective and timely.”*

The correlation coefficient was $r = 0.68$, indicating a **moderate to strong positive association** between the two items. Given that the construct consists of only two items, the commonly used Cronbach's alpha coefficient was not appropriate for interpretation. Instead, the inter-item correlation of 0.68 suggests an acceptable level of internal consistency for a preliminary evaluation of the construct (Briggs & Cheek, 1986; Clark & Watson, 1995). This result supports the validity of using the mean score of these two items to operationalize

the variable *Effective Non-Conformity Management*.

5.2. Descriptive Statistical Analysis

The sample consisted of 150 employees from 44 halal-certified food companies in Bosnia and

Herzegovina, operating across 11 food industry sectors. This structure ensures the representative coverage within the sample of the halal food industry’s main sectors. The distribution of respondents by production sector is presented in *Table 1*.

Table 1. Overview of surveyed companies by production category and number of responses

Production category	Response No.	Response %	Company No.	Company %
Processing and preserving of meat and production of meat products	59	39%	10	23%
Manufacture of other food products	18	12%	4	9%
Manufacture of bakery products, flour-based goods, and confectionery	17	11%	5	11%
Manufacture of ready-made meals and prepared foods	13	9%	5	11%
Manufacture of dairy products	11	7%	6	14%
Manufacture of vegetable and animal oils and fats	10	7%	2	5%
Manufacture of grain mill products	6	4%	3	7%
Processing and preserving of meat – slaughterhouses and fresh meat production	5	3%	3	7%
Animal farming (or: Livestock breeding)	5	3%	2	5%
Processing and preserving of poultry meat	4	3%	2	5%
Manufacture of soft drinks; production of mineral and other bottled waters	2	1%	2	5%
Total	150		44	

Source: Author’s calculation

The meat industry dominates the sample, with 59 respondents (39%) from 10 companies (23%), reflecting its central role in the halal economy of Bosnia and Herzegovina. Other notably represented sectors include bakery products (11%), ready-to-eat food (9%), and dairy products (7%).

The average number of respondents per company ranged from 1 to 5.9, indicating heterogeneity in organizational size and varying levels of employee participation in the survey.

Three occupational groups were included in the analysis: quality managers, quality control staff, and production employees.

Table 2. Representation of formally authorized personnel by job position

Job position	N	With authorization		Without authorization	
		No.	%	No.	%
Quality managers	41	32	78%	9	22%
Quality control staff	31	25	81%	6	19%
Production employees	78	25	32%	53	68%
Total	150	82	55%	68	45%

Source: Author’s calculation

The first step of the analysis examined whether respondents possessed formal authorization for internal halal compliance verification through appointment to internal halal audit teams. The results indicate that 55% of respondents reported having formal authorization, while 45% did not, with substantial differences across job positions. Among respondents, quality managers (78%; 32 of 41) and quality control employees (81%; 25 of 31) were predominantly authorized, whereas only 32% (25 of 78) of production employees reported having formal authorization.

The distribution of formal authorization by job position is presented in Table 2.

The second question aimed to determine whether the participants in the study had attended **formal halal education**. The results showed a high proportion of respondents (82%; 123 of 150) who had participated in formal halal training, while a smaller proportion (18%; 27 of 150) reported not having attended such education. The distribution of respondents who completed halal education across different job positions is presented in the following Table 3.

Table 3. Distribution of respondents who attended formal halal education by job position

Job position	N	Educated / Trained		Not educated / Not trained	
		No.	%	No.	%
Quality managers	41	39	95%	2	5%
Quality control staff	31	31	100%	0	0%
Production employees	78	53	68%	25	32%
Total	150	123	82%	27	18%

Source: Author’s calculation

The descriptive statistics for the key variables are presented in Table 4.

Table 4. Descriptive statistics for key variables

Sample characteristic	Category	N	%
Attendance of halal education	Educated / Trained	123	82%
	Not educated / Not trained	27	18%
Formal authorization	With authorization	82	55%
	Without authorization	68	45%

Source: Author’s calculation

Descriptive analysis of halal team composition (Table 1.; with authorization) indicates that quality managers and quality control employees account for 69.5% (57 of 82) of quality control personnel, while production employees constitute only 30.5% (25 of 82), despite their

central role in daily operational processes. This pattern reflects a prevailing practice of assigning compliance-related authority primarily to quality-related job positions, with limited inclusion of operational employees.

5.3. Testing H1 – Effect of Formal Authorization on Perceived Effectiveness

To test Hypothesis H1, an independent-samples **t-test** was conducted to compare the mean score

of perceived non-conformity effectiveness between employees with and without formal authorization. The results are summarized in *Table 5*.

Table 5. Differences in Perceived Effectiveness by Formal Authorization

Group	N	Mean	Std. Dev.	t	df	p-value
With authorization	82	4.87	0.35	4.92	148	< 0.001*
Without authorization	68	4.58	0.72			
Mean difference		0.29				

(* $p < 0.001$ statistically highly significant); Source: Author's calculation

The analysis revealed a **highly significant statistical difference** in perceived effectiveness between formally authorized employees ($M = 4.87$, $SD = 0.35$) and those without authorization ($M = 4.58$, $SD = 0.72$). The mean difference of 0.29 indicates a positive effect of formal authorization.

Accordingly, **H1 is accepted**, confirming a statistically significant positive difference in perceived effectiveness of non-conformity management between employees with and without formal authorization.

5.4. Testing H2 – Effect of Formal Halal Education

To test **Hypothesis H2**, an independent-samples **t-test** was performed to compare mean scores of perceived non-conformity management effectiveness between employees who had completed formal halal education and those who had not.

The results are presented in the following *Table 6*.

Table 6. Differences in perceived effectiveness with respect to formal halal education

Group	N	Mean	Std. Dev.	t	df	p-value
Educated / Trained	123	4.78	0.53	2.01	148	0.046*
Not educated / Not trained	27	4.56	0.78			
Mean difference		0.22				

(* $p < 0.05$ statistically significant); Source: Author's calculation

The t-test results indicate a **statistically significant difference** ($p = 0.046$) in the mean evaluation of effectiveness between employees who completed formal halal education ($M = 4.78$, $SD = 0.53$) and those who did not attend such training ($M = 4.56$, $SD = 0.78$). The mean difference of 0.22 indicates a positive effect of formal halal education.

Accordingly, **Hypothesis H2 is accepted**, indicating the presence of a statistically significant positive difference in the perceived effectiveness of non-conformity management between employees who attended formal halal education and those who did not.

5.5. Testing H3 – Differences Across Job Positions

To examine whether there are differences in perceived effectiveness of non-conformity management among the three functional job groups, a **one-way analysis of variance (ANOVA)** was conducted. The results are presented in *Table 7*.

Table 7. One-way ANOVA – Differences in perceived effectiveness by job position

Job position	N	Mean	Std. Dev.	Min	Max
Quality managers	41	4.85	0.42	3.5	5.0
Quality control staff	31	4.79	0.48	3.5	5.0
Production employees	78	4.65	0.67	2.5	5.0

Source: Author’s calculation

Source of variance	SS	df	MS	F	p-value	η^2
Between groups	1.24	2	0.62	3.87	0.023*	0.05
Within groups	23.56	147	0.16			
Total	24.80	149				

(* $p < 0.05$ statistically significant); Source: Author’s calculation

The ANOVA results indicate a **statistically significant difference** in the mean evaluation of non-conformity management effectiveness among the three job groups ($p = 0.023$). The effect size ($\eta^2 = 0.05$) suggests a **small to**

moderate effect of job position on perceived effectiveness.

To identify specific group differences, a **post hoc analysis** was performed using the **Tukey HSD test**. The results are shown in Table 8.

Table 8. Tukey HSD post hoc analysis

Group comparison	Mean difference	95% CI	p-value
Quality managers vs. Production employees	0.20	[0.02, 0.38]	0.026*
Quality control staff vs. Production employees	0.14	[-0.06, 0.34]	0.214
Quality managers vs. Quality control staff	0.06	[-0.16, 0.28]	0.791

(* $p < 0.05$ statistically significant); Source: Author’s calculation

The post hoc analysis revealed that the only **statistically significant difference** in perceived effectiveness of non-conformity management occurred between **quality managers** and **production employees** ($p = 0.026$), with quality managers reporting **higher mean effectiveness scores** (mean difference = 0.20). No statistically significant differences were found between **quality managers and quality control staff**, nor between **quality control staff and production employees**.

Accordingly, **Hypothesis H3 is accepted**, indicating that there is a statistically significant difference in perceived effectiveness of non-conformity management across job positions, with the most pronounced differences observed between managerial and production positions.

5.6. Comparative Overview of Hypothesis Testing

The results of all three hypothesis tests are summarized in Table 9.

Table 9. Summary of hypothesis testing results

Hypothesis	Test	Result	p-value	Effect size*	Status
H1	T-test	t(148) = 4.92	< 0.001	d = 0.51	Accepted
H2	T-test	t(148) = 2.01	0.046	d = 0.33	Accepted
H3	ANOVA	F(2,147) = 3.87	0.023	$\eta^2 = 0.05$	Accepted

* Effect size calculated as Cohen’s d (Cohen, 1988); Source: Author’s calculation

As shown in Table 9, all three hypotheses were statistically supported. The strongest effect was observed for formal authorization (H1, $d = 0.51$), indicating its key role in shaping

employees’ perceptions of system effectiveness. According to Cohen’s interpretation (1988), this value represents a medium-to-large effect size. Formal halal education (H2, $d = 0.33$)

demonstrated a small-to-medium effect, while job position ($H3$, $\eta^2 = 0.05$) exhibited a small effect size ($0.01 = \text{small}$, $0.06 = \text{medium}$, $0.14 = \text{large}$).

5.7. Discussion and Recommendations

This study encompassed a wide range of industrial sectors, as clearly reflected in the sample structure by production categories (*Table 1*). This heterogeneity is particularly important because the complexity of halal requirements varies across different sectors of the halal food industry. The results clearly demonstrate that formal authorization and formal halal education have a statistically significant positive effect on how employees evaluate the effectiveness of non-conformity management.

The effect of **formal authorization** on the perceived effectiveness of non-conformity management proved to be the most pronounced (mean difference = 0.29, $d = 0.51$), suggesting that granting employees clear authority and responsibility is crucial for fostering a sense of competence and confidence in resolving non-conformities. This finding is further supported by the lower standard deviation within the authorized group (0.35 vs. 0.72), indicating greater consistency in employee evaluations.

The effect of **formal education** (mean difference = 0.22) also proved significant, though somewhat weaker, implying that knowledge of halal standards is a necessary but not sufficient condition for the effective management of non-conformities.

The effect of **job position** ($\eta^2 = 0.05$) confirms that statistically significant differences exist in perceived effectiveness across functional roles. The post hoc analysis revealed that the most notable difference occurs between quality managers and production employees (mean difference = 0.20, $p = 0.026$). This finding reflects structural asymmetries in access and authority within the organizational hierarchy, where managerial positions tend to have a better understanding of systemic aspects of quality management.

The identified impact of formal authorization underscores its importance in strengthening the dimension of employee participation and in

establishing a direct channel of communication with management. These findings are fully consistent with Self-Determination Theory, according to which autonomy is a key predictor of engagement and work effectiveness (Ryan & Deci, 2000).

As previously emphasized in this paper, organizational effectiveness is influenced by the factors of participation and empowerment (Bahtijarević-Šiber, 1999; Razalli et al., 2016). While formal authorization reinforces the dimension of responsibility and decision-making autonomy, employee education enhances understanding of halal standards and procedures, leading to greater internal motivation and a stronger sense of influence over process outcomes.

The research results also indicate that operational staff (production employees) report a significantly lower perception of non-conformity management effectiveness (*Table 6*). This finding highlights a potentially critical “participation gap” within halal quality management systems, whereby front-line production workers play a key role in identifying non-conformities but remain insufficiently integrated into the system of formal authorization and decision-making. Hypothetically, an educated employee may recognize a non-conformity, yet without formal authorization is unable to independently initiate corrective action. Conversely, granting formal authorization and integrating these employees into the halal team as competent and empowered members enables organizations to respond more rapidly and effectively.

Based on the above findings, the following recommendations are proposed:

Targeted education - Food companies should provide targeted training for employees, focusing on the identification, monitoring, and resolution of halal non-conformities.

Systematic approach to authorization - It is recommended to expand formal authorization to a larger number of production employees, as they are positioned on the front line of non-conformity detection.

Monitoring and evaluation - Organizations should introduce performance measurement systems that monitor the number of non-

conformities, response speed, effectiveness of corrective measures, and perceived system effectiveness among different employee groups. From the above considerations, it can be concluded that granting formal authorization is not merely an administrative formality but a strategic process that strengthens employees' confidence in their role as custodian of halal integrity. This, in turn, has a positive systemic impact on the overall effectiveness and credibility of the halal quality management system (HQMS).

5.8. Study Limitations

This study is based on the evaluation of employees' perceptions and did not include the measurement of actual performance outcomes. Because it relies on subjective perceptions, the findings may be affected by response bias and social desirability tendencies. The research was cross-sectional, which does not allow for conclusions about causal relationships.

Furthermore, the study covered only the food industry in Bosnia and Herzegovina, which limits the generalizability of the findings to other production or service sectors.

Future research could examine the correlation between perceived effectiveness and objective quality indicators, such as the number of non-conformities, number of customer complaints, corrective action response time, and recurrence rate. Such an approach would help overcome some of the limitations of the present study. In addition, it would be useful to investigate this issue in other contexts, including service industries and different regional settings, in order to confirm the broader applicability of the results.

Despite these limitations, the present study provides valuable insights into the importance of formal authorization within the context of halal quality management and paves the way for further research in this area.

6. CONCLUSION

This study aimed to examine the impact of formal authorization and formal halal education

on the effectiveness of non-conformity management in halal-certified companies in Bosnia and Herzegovina. The empirical analysis was conducted on a sample of 150 respondents from 44 companies operating across 11 food industry sectors.

The results indicate a statistically significant relationship between employees' formal authorization and their perceptions of the effectiveness of non-conformity management within the examined sample. Formally authorized employees assessed the system as more effective, confirming that clearly delegated authority contributes to stronger confidence in procedural control and corrective action. Similarly, formal halal education was found to have a positive influence on how employees evaluate system performance, although the effect was less pronounced than that of authorization. Educated employees demonstrated greater awareness of the mechanisms for identifying and addressing non-conformities. Taken together, these findings reinforce the conclusion that both authorization and education are important determinants of perceived system efficiency, with authorization emerging as the more influential factor.

Despite its limitations, the findings of this study suggest a significant association between formal authorization and perceived effectiveness of non-conformity management. Given the cross-sectional design of the study, the identified relationships should be interpreted as associations rather than causal effects.

Theoretically, this research contributes to a better understanding of human resource management practices in the halal context, by operationalizing the constructs of employee authorization and their role in non-conformity management and empirically testing their interrelationship. Methodologically, the study offers a useful framework for assessing perceived non-conformity management effectiveness, based on two core dimensions: speed of identification and effectiveness of corrective action.

From a practical perspective, the study provides clear recommendations for managers of halal-certified food companies, emphasizing that systematic implementation of formal authorization and targeted halal education for

all employees involved in the halal production chain can significantly enhance both process efficiency and system integrity. The findings presented in this study also highlight a potential area for improvement through the broader application of authorization mechanisms across all functional levels.

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Utjecaj formalnog ovlaštenja i halal edukacije na efikasno upravljanje neusklađenostima u halal prehrambenoj industriji

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Sažetak

U ovom radu predstavljeni su rezultati analize utjecaja formalnog ovlaštenja i halal edukacije zaposlenih na efikasnost upravljanja neusklađenostima u primjeni halal standarda u prehrambenoj industriji Bosne i Hercegovine. Istraživanje polazi od pretpostavke da formalno ovlaštenje halal kompetentnih zaposlenika, operacionalizirano kroz članstvo u halal timu, pozitivno utječe na sposobnost organizacije da pravovremeno identificira i efikasno rješava odstupanja od zahtjeva halal standarda. Metodološki okvir zasniva se na anketnom uzorku od 150 zaposlenih iz 44 halal certificirane prehrambene kompanije u Bosni i Hercegovini. Podaci su analizirani primjenom t-testa za nezavisne uzorke i analize varijanse (ANOVA). Rezultati pokazuju da postoji statistički značajna pozitivna razlika u prosječnoj ocjeni efikasnosti upravljanja neusklađenostima između zaposlenih koji posjeduju formalno ovlaštenje i onih koji ga nemaju. Dodatna analiza obuhvatila je utjecaj formalne halal edukacije, za koju je također utvrđen statistički značajan pozitivan efekat, iako manjeg intenziteta. Utvrđene su, također, značajne razlike percepcije efikasnosti u odnosu na radno mjesto, pri čemu su menadžeri kvaliteta davali veće ocjene efikasnosti od zaposlenih u proizvodnji. U cjelini, nalazi jasno pokazuju da formalno ovlaštenje predstavlja ključni faktor koji doprinosi većoj percipiranoj efikasnosti sistema upravljanja neusklađenostima. Rad nudi praktične preporuke za unapređenje postojećih praksi, uključujući proširenje formalnih ovlaštenja i ciljane edukacije na sve zaposlene uključene u lanac halal proizvodnje, s posebnim naglaskom na operativno osoblje.

Ključne riječi: formalno ovlaštenje; halal edukacija; upravljanje neusklađenostima; halal kvalitet; Bosna i Hercegovina

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