



Assessing Halal Certification Compliance Through Entrepreneurial Search Patterns Within Indonesia's Islamic Legal Framework

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Abstract. Understanding how entrepreneurs engage with regulatory information is essential for improving the implementation of mandatory halal certification. While previous studies have predominantly relied on surveys and interviews, little attention has been paid to digital behavioural evidence generated through online search activities. This study addresses this gap by investigating entrepreneurial regulatory engagement using Google search behaviour related to Indonesia's halal certification system. A total of 559 search queries were extracted from Google Keyword Planner and refined into 392 analytical queries through lexical normalization and duplicate removal. The dataset was analysed using search-intent classification, thematic analysis, descriptive statistics, and Python-based data processing. The findings indicate that informational searches dominate entrepreneurial search behaviour, followed by navigational, transactional, and procedural searches, suggesting that entrepreneurs primarily seek regulatory knowledge and institutional guidance before engaging in certification procedures. Thematic analysis further reveals that certification processes, institutional information, and general halal knowledge represent the principal information needs. This study proposes a Behavioural Information-Seeking Framework for Halal Certification, demonstrating that digital search behaviour reflects successive stages of regulatory engagement from information acquisition to compliance action. The findings contribute to the literature by extending search-intent analytics to Islamic economic governance and provide practical insights for strengthening digital communication strategies and evidence-based halal governance.

Keywords: Halal Certification; Search Intent Analysis; Digital Search Behaviour; Islamic Economic Governance.

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INTRODUCTION

Halal certification has become an essential pillar of contemporary Islamic economic governance, extending far beyond its traditional function of verifying compliance with Sharia principles. In today's halal economy, certification serves as a strategic mechanism for strengthening consumer confidence, enhancing product credibility, promoting market transparency, and facilitating participation in both domestic and international halal markets. As

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the global halal industry continues to expand, many Muslim-majority countries have increasingly institutionalized halal certification within their regulatory systems to protect consumers while enhancing the competitiveness of national halal industries (Ibrahim et al., 2023; Yuanitasari et al., 2024; Najla & Huda, 2025). In Indonesia, this institutional transformation was formalized through the enactment of the Halal Product Assurance Law (Law No. 33 of 2014), which established halal certification as a mandatory legal requirement under the authority of the Halal Product Assurance Organizing Agency (Badan Penyelenggara Jaminan Produk Halal—BPJPH). Consequently, halal certification now represents not only religious compliance but also an important instrument of economic governance and business competitiveness (BPJPH, 2024).

Despite substantial regulatory reforms, the implementation of mandatory halal certification continues to present considerable challenges, particularly for micro, small, and medium-sized enterprises (MSMEs). Many entrepreneurs remain uncertain about certification procedures, documentary requirements, administrative costs, processing timelines, and the respective roles of institutions involved in the certification process (Darmalaksana, 2023). Such uncertainty frequently results in halal certification being perceived as an administrative burden rather than a strategic investment capable of creating long-term business value (Widigdo & Bayinah, 2023; Fathoni et al., 2025). Previous reports indicate that these implementation challenges are closely associated with limited regulatory literacy, fragmented access to reliable information, and inadequate dissemination of updated regulatory guidance. As a consequence, the effectiveness of Indonesia's halal governance framework remains constrained despite continuous improvements in the regulatory system (BPJPH, 2025; Gustiana, 2023).

Existing scholarship has substantially advanced the understanding of halal certification through analyses of legal frameworks, institutional performance, compliance determinants, and entrepreneurs' perceptions of certification policies. While these studies have generated valuable theoretical and practical insights, they rely predominantly on surveys, interviews, and institutional assessments that capture perceptions after entrepreneurs have interacted with the regulatory system. Consequently, considerably less attention has been devoted to understanding how entrepreneurs actively search for, interpret, and evaluate regulatory information before making compliance decisions. This information-seeking stage represents a critical yet underexplored dimension of halal certification compliance because it shapes entrepreneurs' initial understanding of regulatory obligations and influences subsequent compliance behaviour.

Recent advances in digital behavioural research have demonstrated that online search activities constitute valuable behavioural evidence of individuals' information needs, decision-making processes, and responses to regulatory environments. Unlike questionnaire-based data, which may be influenced by recall errors or social desirability bias, search queries are generated voluntarily during actual information-seeking activities and therefore capture users' immediate concerns in real-world contexts (Dou & Guo, 2020). Long-tail search queries are particularly informative because they reveal highly specific procedural questions, institutional uncertainties, and operational challenges encountered by users while seeking regulatory guidance. Consequently, search-intent analysis provides a complementary methodological perspective for examining regulatory engagement through naturally occurring digital behavioural data rather than relying exclusively on self-reported perceptions (Zhang et al., 2021).

Although digital trace data have been increasingly applied in studies of consumer behaviour, digital marketing, public policy, and information systems, their application within Islamic economic law remains limited. Existing halal-related digital research has focused primarily on consumer preferences, halal purchasing behaviour, and online marketing strategies, whereas entrepreneurs' online search behaviour concerning halal certification has received comparatively little scholarly attention. More importantly, previous studies have rarely examined how digital search behaviour reflects entrepreneurs' interpretation of regulatory obligations or reveals deficiencies in regulatory communication. This methodological gap limits current understanding of how entrepreneurs engage with Indonesia's mandatory halal certification system during the critical information-seeking stage that precedes formal compliance.

Responding to these limitations, this study investigates entrepreneurial engagement with Indonesia's halal certification framework by analysing one hundred long-tail Google search queries related to halal certification using a search-intent analytical approach. Rather than measuring entrepreneurs' perceptions after regulatory interactions have occurred, the study utilises digital behavioural evidence to identify dominant information needs, classify patterns of search intention, and interpret recurring concerns associated with regulatory compliance. By examining naturally occurring search behaviour, this research offers a behavioural perspective on how entrepreneurs understand and navigate halal certification requirements within Indonesia's Islamic legal framework.

This study contributes to the literature in three important respects. First, it introduces digital search behaviour as an empirical source of behavioural evidence for assessing entrepreneurial engagement with halal certification regulations. Second, it extends the application of search-intent analytics to the field of Islamic economic law by demonstrating how online information-seeking behaviour can be used to evaluate regulatory communication, institutional clarity, and compliance readiness. Third, the findings provide practical implications for BPJPH and other relevant stakeholders by identifying specific procedural, informational, and institutional issues that require clearer communication strategies and more accessible regulatory guidance to improve the implementation of mandatory halal certification among Indonesian MSMEs.

LITERATURE REVIEW

Halal Certification as a Regulatory Governance Mechanism

Recent scholarship recognises halal certification as more than a mechanism for verifying compliance with Islamic dietary principles. It has increasingly been conceptualised as a regulatory governance instrument that supports consumer protection, strengthens institutional accountability, and enhances the credibility of halal markets. As halal industries continue to expand globally, governments have adopted more formalised certification systems to improve regulatory oversight, facilitate international trade, and reinforce confidence across halal value chains (Ibrahim et al., 2023; Yuanitasari et al., 2024). The evolution of halal certification research also reflects a growing emphasis on governance, compliance, traceability, and digital transformation, indicating that halal assurance has become an integral component of contemporary regulatory systems rather than solely a religious requirement.

Within Indonesia, the implementation of Law No. 33 of 2014 significantly reconfigured the institutional architecture of halal governance by assigning regulatory responsibility to BPJPH while redefining the respective functions of certification bodies, inspection agencies, and religious authorities. Previous studies acknowledge that this institutional reform has strengthened legal certainty and consumer protection. However, they also report persistent implementation challenges, including institutional coordination, regulatory complexity, and unequal access to certification services, particularly among micro, small, and medium-sized enterprises (Darmalaksana, 2023; Widigdo & Bayinah, 2023).

Existing studies have therefore provided a comprehensive understanding of halal certification from institutional and legal perspectives. Nevertheless, considerably less attention has been

devoted to examining how entrepreneurs themselves engage with regulatory information during the certification process. This limitation is particularly important because the effectiveness of regulatory governance depends not only on institutional design but also on how regulated actors interpret and respond to regulatory requirements.

Entrepreneurial Compliance with Halal Certification

Entrepreneurial compliance with halal certification extends beyond fulfilling legal obligations and reflects a broader behavioural process through which business owners interpret, evaluate, and respond to regulatory requirements. Previous studies suggest that compliance is shaped by multiple factors, including halal literacy, regulatory knowledge, institutional trust, perceived business benefits, and entrepreneurs' readiness to navigate certification procedures. Although halal certification is widely recognised as a strategic asset for improving consumer confidence and expanding market opportunities, compliance among MSMEs remains uneven because many businesses continue to face procedural complexity, limited regulatory understanding, and insufficient institutional support (Darmalaksana, 2023; Widigdo & Bayinah, 2023; Fathoni et al., 2025). Recent evidence further indicates that regulatory processes, trust, and consumer awareness significantly influence MSMEs' decisions to obtain halal certification, highlighting that compliance is not merely a legal issue but also a behavioural and managerial decision.

Existing research has also emphasised that barriers to halal certification are not limited to financial constraints but include inadequate access to reliable information, bureaucratic complexity, and low levels of halal certification literacy. These challenges reduce entrepreneurs' confidence in initiating the certification process despite recognising its strategic value for business competitiveness and market expansion. Consequently, several scholars have argued that strengthening regulatory communication, improving institutional guidance, and enhancing halal literacy are essential to increasing certification uptake among MSMEs (Fathoni et al., 2024; Bahrudin et al., 2025; Pratikto et al., 2023).

Despite these advances, the existing literature has predominantly examined halal certification compliance through surveys, behavioural intention models, or post-certification outcomes. Comparatively little attention has been devoted to the information-seeking activities that occur before entrepreneurs decide to pursue certification. Since regulatory engagement typically begins when entrepreneurs search for certification requirements, procedures, and institutional guidance, analysing online search behaviour offers an opportunity to observe naturally occurring pre-compliance behaviour. Accordingly, this study positions digital search behaviour

as an empirical indicator of entrepreneurial engagement with halal certification regulations, complementing conventional survey- and interview-based approaches while extending the compliance literature within the context of Islamic economic law.

Digital Search Behaviour and Information-Seeking Theory

Information-seeking behaviour refers to the process through which individuals actively search for, select, and utilise information to reduce uncertainty and support decision-making. Wilson (1999) conceptualised information seeking as a response to perceived knowledge gaps, while subsequent studies emphasised that digital technologies have fundamentally transformed how individuals access and evaluate information. With the widespread adoption of internet search engines, online search behaviour has become an important source of behavioural evidence because search queries are generated voluntarily during real-world decision-making processes rather than through researcher intervention (Wilson, 1999; Case & Given, 2016; Dou & Guo, 2020).

Recent advances in digital behavioural research have demonstrated that search engine queries provide valuable insights into users' interests, intentions, and informational needs across various contexts, including health, finance, tourism, and consumer behaviour. Unlike conventional surveys, which rely on respondents' retrospective perceptions, digital search data capture naturally occurring behavioural traces that reflect immediate information needs. Long-tail queries are particularly valuable because they reveal highly specific questions, procedural concerns, and contextual information that are often unavailable through traditional data collection methods. Consequently, search behaviour has increasingly been recognised as a reliable empirical resource for understanding behavioural patterns and decision-making processes in digital environments (Broder, 2002; Dou & Guo, 2020; Zhang et al., 2021).

Within the context of halal certification, entrepreneurs frequently rely on online search engines to obtain information regarding certification procedures, administrative requirements, institutional responsibilities, and regulatory updates before initiating formal certification. Despite the growing application of digital trace data in business and information systems research, its use in studies of halal certification remains limited. Existing research has primarily examined entrepreneurs' compliance through surveys or interviews, whereas online search behaviour has rarely been considered as behavioural evidence of regulatory engagement. Therefore, this study adopts digital search behaviour as an alternative empirical approach for

understanding entrepreneurs' information-seeking behaviour and pre-compliance engagement within Indonesia's halal certification system.

Search Intent Analytics and Long-Tail Query Analysis

Search intent refers to the underlying purpose or motivation that drives users to submit a search query. Rather than representing isolated keywords, search queries reflect users' informational needs and decision-making objectives at a particular stage of their information-seeking process. Broder (2002) classified web search intent into three primary categories: informational, navigational, and transactional. Subsequent studies have expanded this taxonomy by incorporating commercial and procedural intents, demonstrating that search intent provides valuable insights into users' behavioural patterns and decision-making contexts. Consequently, search intent analysis has become an important analytical approach in information retrieval, digital marketing, and consumer behaviour research because it enables researchers to infer users' motivations from naturally occurring search activities (Broder, 2002; Dou & Guo, 2020).

Among various forms of search queries, long-tail queries are considered particularly informative because they capture specific questions, detailed procedural concerns, and context-dependent information needs. Compared with short and generic keywords, long-tail queries more accurately represent users' immediate intentions and therefore provide richer behavioural evidence for understanding complex decision-making processes. Recent advances in natural language processing and query classification have further improved the ability to identify search intent from long-tail search data, allowing researchers to analyse behavioural patterns across diverse domains, including e-commerce, health information, and public services (Zhang et al., 2021; Jansen et al., 2008).

Despite the growing application of search intent analytics in digital commerce and information systems, its use within Islamic economic law remains extremely limited. Existing halal-related studies have largely relied on questionnaires, interviews, or institutional reports to evaluate certification behaviour, while digital search intent has rarely been explored as an empirical indicator of entrepreneurs' regulatory engagement. Therefore, this study applies search intent analysis to long-tail Google search queries to identify entrepreneurs' dominant information needs and behavioural responses toward Indonesia's halal certification system. By integrating search intent analytics with the perspective of Islamic economic law, this study extends the application of digital behavioural analysis to the evaluation of halal certification compliance.

METHOD

Research Design

This study employed a qualitative descriptive approach using digital trace data derived from Google search queries. Rather than relying on questionnaires or interviews, the research analysed naturally occurring online search behaviour to understand entrepreneurs' information-seeking activities regarding halal certification in Indonesia. Digital trace data provide behavioural evidence generated during actual information searches, thereby reducing recall bias and social desirability bias commonly associated with self-reported data (Wilson, 1999; Case & Given, 2016; Dou & Guo, 2020).

The analytical framework adopted search intent analysis to identify users' underlying information needs reflected in Google search queries. This approach has been widely applied in information retrieval and digital behaviour research because search queries represent users' immediate intentions and decision-making processes during information seeking (Broder, 2002; Dou & Guo, 2020).

Data Collection

The dataset was obtained using Google Keyword Planner (GKP), the official keyword research platform provided by Google Ads. Google Keyword Planner generates keyword suggestions based on actual Google search activities, making it a reliable source of digital behavioural data for analysing users' information-seeking patterns. Compared with third-party keyword research tools, GKP provides direct access to Google's search ecosystem and has been widely used in digital marketing and search behaviour studies.

Data collection was conducted using the seed keyword "halal certification". The extraction process generated 559 related search queries, representing users' search activities associated with halal certification in Indonesia. The dataset consisted of various keyword forms, including informational, procedural, transactional, and navigational queries, as well as searches related to certification procedures, institutional information, certification costs, product verification, and regulatory issues.

Data Pre-processing

To improve analytical validity, the raw dataset underwent a systematic multi-stage preprocessing procedure before analysis. First, all keywords were standardised by converting text into lowercase and removing unnecessary punctuation, duplicated spaces, and obsolete

year-specific expressions (e.g., 2020, 2021, 2022, and 2023). Second, duplicated keywords and lexical variations with identical semantic meanings were consolidated through semantic normalisation. Third, irrelevant artefacts, including URLs, PDF references, shortened links, and incomplete search phrases, were excluded from the dataset.

Unlike conventional keyword frequency studies, this research did not analyse every keyword individually. Instead, semantically similar queries expressing the same information need (e.g., *how to register for a halal certificate*, *how to register for a halal certificate*, and *halal certificate registration*) were grouped into a single canonical query through semantic deduplication. This procedure reduced lexical redundancy while preserving the diversity of users' search intentions. Brand-related searches (e.g., *Gacoan halal* or *Mixue halal*) were retained because they represent a distinct category of halal-related information seeking, namely product halal verification, which reflects public engagement with halal assurance rather than entrepreneurial certification procedures.

Table 1. Dataset Preparation for Search Intent Analysis

Stage	Number of Queries
Raw Google Keyword Planner queries	559
Remove BRAND entries	97
Remove obsolete year-specific queries	38
Remove artefacts (URL/PDF/incomplete queries)	7
Semantic deduplication	25
Final analytical queries	392

Source: Authors' processing of Google Keyword Planner data (2026).

Following preprocessing, the cleaned dataset consisted of unique analytical queries that served as the basis for search intent classification and thematic analysis.

Search Intent Classification

The cleaned search queries were classified using a search intent framework adapted from Broder (2002) and subsequent developments in information retrieval research (Jansen et al., 2008; Dou & Guo, 2020). Each query was manually coded according to its dominant information objective into four principal categories:

- Informational Intent, referring to searches seeking factual knowledge or general information.
- Procedural Intent, referring to searches related to certification procedures, registration, requirements, and administrative processes.

- Navigational Intent, referring to searches intended to locate specific institutions, websites, or digital services.
- Transactional Intent, referring to searches associated with obtaining services, certification, or other action-oriented objectives.

To improve coding consistency, semantically equivalent keywords were assigned to the same intent category based on the overall meaning of the complete search phrase rather than isolated words.

Data Analysis

Data analysis was conducted in two stages. First, descriptive frequency analysis was performed to identify dominant search themes and search intent categories. Second, qualitative thematic analysis was employed to interpret recurring patterns of entrepreneurs' information needs regarding halal certification. The analysis focused on understanding how users interact with halal certification regulations through online information-seeking behaviour rather than measuring causal relationships among variables.

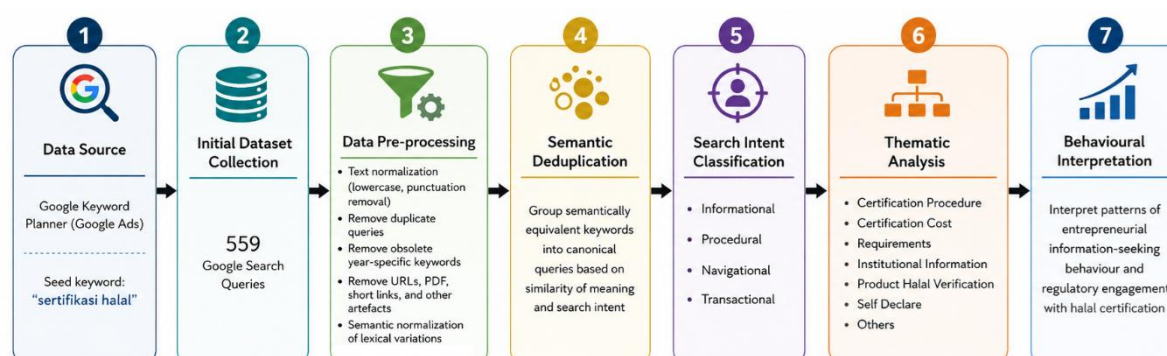


Figure 1. Research workflow for analysing entrepreneurial information-seeking behaviour regarding halal certification using Google Keyword Planner search queries.

Source: Developed by the authors

The overall analytical workflow is illustrated in Figure 1, beginning with keyword extraction from Google Keyword Planner, followed by preprocessing, semantic deduplication, search intent classification, thematic coding, and interpretation of behavioural patterns.

RESULTS

Overview of the Search Query Dataset

This study analysed Google search queries related to halal certification collected from Google Keyword Planner, Google's official keyword research platform. Using the seed keyword "halal

certification”, the initial extraction generated 559 search queries representing users' information-seeking behaviour concerning halal certification in Indonesia. Following data preprocessing—including duplicate removal, lexical normalization, and exclusion of irrelevant or obsolete queries—the final analytical dataset consisted of 392 cleaned search queries that were subsequently classified according to their dominant search intent.

Unlike traditional survey-based studies, the dataset reflects naturally occurring search behaviour generated during real information-seeking activities. Consequently, each search query represents an independent expression of users' information needs rather than responses to predefined questionnaire items. To preserve behavioural diversity, only duplicate and lexically equivalent queries were consolidated during preprocessing, whereas semantically distinct queries were retained for subsequent manual coding. This approach ensured that the analysis captured a broad spectrum of information-seeking behaviour associated with halal certification.

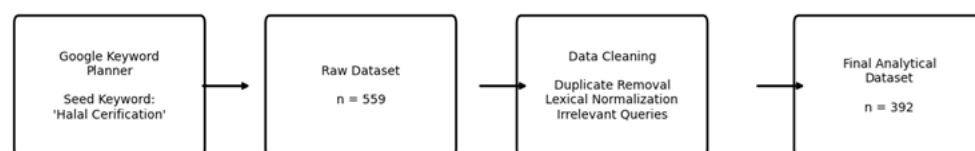


Figure 2. Data Preparation Pipeline

Figure 2 summarises the data preparation process employed in this study. From the initial dataset of 559 Google search queries, 167 entries were excluded through preprocessing due to duplicate records, lexical redundancy, obsolete year-specific queries, and irrelevant search artefacts. The resulting dataset of 392 cleaned queries constituted the empirical basis for search intent classification and thematic interpretation.

Distribution of Search Intent

To examine users' behavioural engagement with Indonesia's halal certification system, the 392 cleaned search queries were classified into four search intent categories based on their dominant information objective: Informational, Procedural, Navigational, and Transactional. The classification followed the coding protocol described in the methodology, which combines lexical indicators with contextual interpretation to assign each query to the most appropriate intent category.

The results indicate that Informational Intent represents the largest proportion of search queries, accounting for 161 queries (41.16%), followed by Navigational Intent with 140 queries

(35.35%). Transactional Intent contributes 51 queries (13.13%), whereas Procedural Intent represents the smallest category with 40 queries (10.35%). These findings suggest that online information-seeking related to halal certification is primarily driven by the need to acquire knowledge and locate authoritative institutional resources rather than immediately initiating certification procedures.

Table 2. Distribution of Search Intent

Search Intent	Frequency	Percentage (%)
Informational	161	41.16
Navigational	140	35.35
Transactional	51	13.13
Procedural	40	10.35
Total	392	100.00

Source: Python's analysis based on Google Keyword Planner search query data (2026).

The predominance of informational searches indicates that entrepreneurs and the general public continue to rely heavily on search engines to understand halal certification concepts, regulatory requirements, certification costs, and related terminology before engaging in the certification process. At the same time, the relatively high proportion of navigational searches demonstrates users' dependence on official institutions and digital certification platforms, such as BPJPH, SIHALAL, and other government-managed services, to obtain reliable regulatory information. Meanwhile, transactional queries reflect users' intention to undertake concrete certification-related actions, including registration and application processes, whereas procedural queries mainly concern guidance on administrative steps, documentation requirements, and certification mechanisms. Collectively, these findings reveal that entrepreneurial information-seeking behaviour surrounding halal certification is characterised by a progressive transition from information acquisition towards institutional engagement and regulatory compliance.

Major Themes of Halal Certification Information Needs

To further explore the substantive focus of users' online information-seeking behaviour, the cleaned search queries were grouped into broader thematic categories according to their primary informational content. Unlike the search intent analysis presented in the previous section, thematic classification focuses on what information users search for, thereby providing a deeper understanding of the major issues surrounding Indonesia's halal certification system.

The analysis identified eight principal themes of halal certification information needs (Table 3). Certification Process emerged as the dominant theme, comprising 138 queries (34.85%), followed by General Halal Information with 120 queries (30.30%), and Institutional

Information with 76 queries (19.19%). Collectively, these three themes accounted for more than four-fifths of all search queries, indicating that entrepreneurs primarily seek operational guidance, fundamental regulatory knowledge, and information concerning official certification authorities.

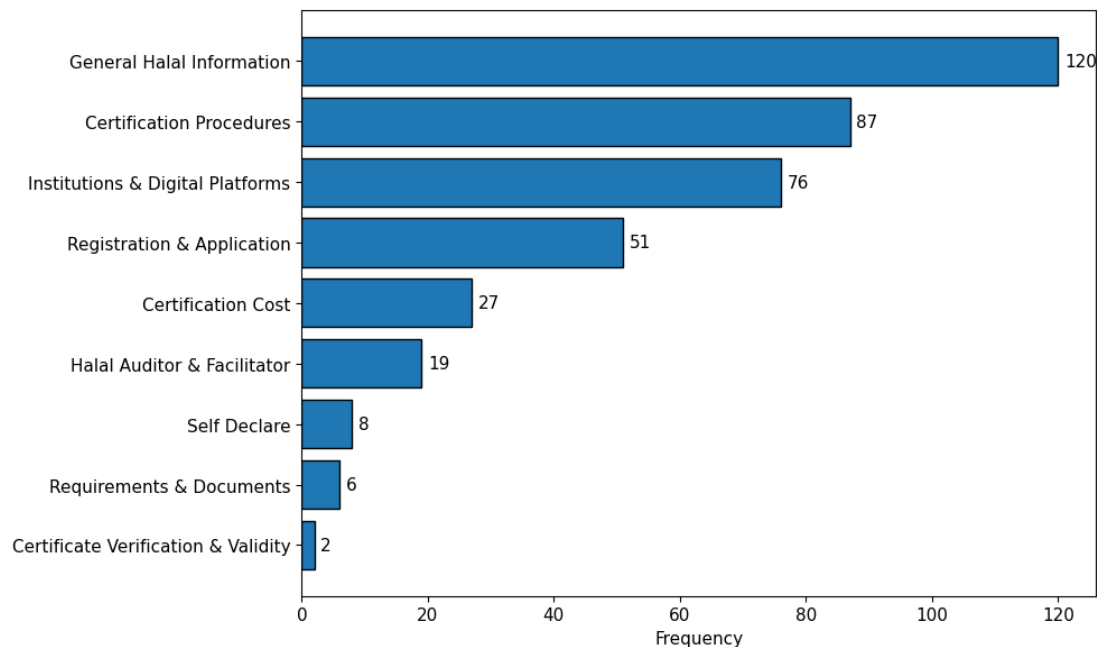


Figure 3. Major Themes of Halal Certification Search Queries

Source: Developed by the authors

Searches classified under Certification Process predominantly concerned registration procedures, certification applications, administrative processes, and implementation stages, suggesting that entrepreneurs require practical guidance to navigate mandatory halal certification. Meanwhile, the prominence of General Halal Information reflects continuing demand for conceptual understanding of halal certification, halal products, and certification terminology. The substantial proportion of Institutional Information further indicates that users frequently rely on official organisations and digital certification platforms, such as BPJPH and SIHALAL, to obtain trustworthy regulatory information.

Conversely, themes such as Certification Cost, Halal Professionals, Self-Declare Certification, Requirements, and Certificate Verification appeared less frequently. Nevertheless, these themes reveal several specific concerns related to implementation, including certification affordability, the role of halal auditors and facilitators, simplified certification mechanisms, documentary requirements, and verification of certificate validity. Although representing smaller proportions of total searches, these topics remain important because they reflect

operational challenges encountered by entrepreneurs during different stages of the halal certification process.

Behavioural Interpretation of Entrepreneurial Information-Seeking

The distribution of search intent and thematic categories reveals that entrepreneurs' engagement with Indonesia's halal certification system follows a progressive information-seeking pattern rather than an immediate compliance-oriented behaviour. The predominance of informational searches indicates that users initially prioritise understanding fundamental aspects of halal certification, including certification concepts, institutional responsibilities, certification costs, and regulatory requirements, before engaging in administrative procedures. This finding suggests that information acquisition constitutes the first stage of regulatory compliance within the halal certification ecosystem.

The thematic analysis further demonstrates that operational concerns dominate entrepreneurs' online searches. The high frequency of queries related to certification processes and institutional information reflects persistent uncertainty regarding administrative procedures and the roles of relevant certification authorities. Rather than searching for general religious concepts, entrepreneurs appear to focus on practical questions concerning registration mechanisms, institutional responsibilities, and certification implementation. This behavioural pattern highlights the importance of accessible regulatory communication and user-friendly digital information services for supporting compliance among micro, small, and medium-sized enterprises.

Taken together, the search intent distribution and thematic structure suggest a behavioural progression consisting of four sequential stages: information acquisition, institutional orientation, procedural understanding, and compliance action. This progression indicates that entrepreneurs rely on search engines as an initial gateway for interacting with Indonesia's halal certification system before engaging directly with regulatory institutions. Consequently, digital search behaviour may serve as an alternative behavioural indicator for evaluating public readiness, regulatory literacy, and institutional communication effectiveness within mandatory halal certification policies.

DISCUSSION

Digital Search Behaviour as an Indicator of Regulatory Engagement

The findings demonstrate that Google search behaviour constitutes a valuable source of behavioural evidence for understanding how entrepreneurs engage with Indonesia's mandatory halal certification system. Unlike conventional survey-based approaches that capture perceptions after regulatory interaction has occurred, search query data reflect users' spontaneous information-seeking behaviour during the initial stages of regulatory engagement. The predominance of informational searches observed in this study suggests that entrepreneurs primarily utilise search engines to reduce uncertainty and acquire regulatory knowledge before initiating formal certification procedures. This behavioural pattern supports the proposition that digital search traces represent an early indicator of compliance readiness rather than merely reflecting passive information consumption.

These findings reinforce previous research emphasising the growing value of digital behavioural data in understanding human decision-making processes. Dou and Guo (2020) argue that search queries provide direct evidence of users' underlying information needs because they are voluntarily generated during real information-seeking activities rather than being influenced by questionnaire design or interviewer bias. Similarly, Zhang et al. (2021) demonstrate that long-tail search queries capture highly specific user intentions and therefore offer richer behavioural information than aggregate search frequencies alone. The present study extends these perspectives by applying search-intent analysis to the context of Islamic economic governance, demonstrating that entrepreneurs' digital search behaviour can reveal patterns of regulatory engagement that remain difficult to observe using conventional research methods. The predominance of informational searches observed in this study is consistent with previous evidence showing that access to reliable halal information plays an important role in shaping behavioural intentions and decision-making among Muslim consumers (Febriandika et al., 2023). Extending this perspective, the present study demonstrates that reliable digital information is equally important for entrepreneurs, who rely on search engines to understand regulatory requirements before initiating halal certification.

From the perspective of halal governance, the dominance of informational and institutional searches indicates that entrepreneurs continue to depend heavily on digital information to understand certification requirements, institutional responsibilities, and regulatory procedures. This finding is consistent with previous studies reporting that limited regulatory literacy and

fragmented dissemination of halal certification information remain significant barriers to compliance among Indonesian MSMEs (Darmalaksana, 2023; Widigdo & Bayinah, 2023; Fathoni et al., 2025). However, while earlier studies primarily identified these barriers through surveys and interviews, the present research provides complementary behavioural evidence by demonstrating that these information needs are directly reflected in naturally occurring Google search activities. Consequently, digital search behaviour may serve as a practical indicator for monitoring entrepreneurs' regulatory engagement and evaluating the effectiveness of public communication strategies implemented by halal certification authorities.

Finally, these findings contribute to the broader literature on digital governance by suggesting that search engine data can function as an alternative source of regulatory intelligence. Rather than relying exclusively on administrative records or perception-based surveys, policymakers may utilise aggregated search behaviour to identify emerging information needs, evaluate the clarity of regulatory communication, and detect areas where entrepreneurs continue to experience uncertainty. Within the context of Indonesia's mandatory halal certification policy, this behavioural perspective offers an additional analytical lens for assessing regulatory effectiveness and supports the growing integration of digital trace data into evidence-based public policy and Islamic economic governance.

Information Needs and Regulatory Communication Challenges

The thematic analysis reveals that entrepreneurs' online information needs extend beyond general awareness of halal certification and are primarily concentrated on practical aspects of regulatory compliance. The predominance of searches related to certification processes, institutional information, and general halal certification concepts indicates that entrepreneurs continue to experience uncertainty regarding administrative procedures, responsible institutions, and the operational implementation of Indonesia's mandatory halal certification policy. These findings suggest that information asymmetry remains a significant challenge despite the progressive institutionalisation of halal certification within Indonesia's regulatory framework.

The prominence of process-related queries reflects persistent demand for practical guidance on registration procedures, application mechanisms, documentary requirements, and certification workflows. This finding corroborates previous studies reporting that many Indonesian MSMEs continue to encounter difficulties in understanding certification procedures and navigating the administrative requirements imposed by the Halal Product Assurance Law. Darmalaksana

(2023) argues that the implementation of halal certification policies is frequently constrained by limited regulatory understanding among small businesses, while Widigdo and Bayinah (2023) identify procedural complexity and insufficient dissemination of regulatory information as important barriers to accelerating halal certification. Similarly, Fathoni et al. (2025) demonstrate that administrative complexity, limited institutional support, and inadequate access to reliable information remain among the principal obstacles preventing wider participation in halal certification programmes. The present findings strengthen these conclusions by providing behavioural evidence that these challenges are reflected directly in entrepreneurs' online search activities.

The substantial proportion of searches concerning certification authorities and digital platforms further highlights the importance of institutional communication in supporting regulatory compliance. Frequent searches related to BPJPH, SIHALAL, and other official certification services suggest that entrepreneurs actively seek authoritative sources to verify regulatory information before undertaking certification procedures. From the perspective of digital governance, this behavioural pattern indicates that regulatory effectiveness depends not only on the quality of legal frameworks but also on the accessibility, clarity, and discoverability of digital information (Henninger, 2017; Townley & Koop, 2024). Ibrahim et al. (2023) emphasise that Indonesia's halal certification system has undergone significant institutional transformation following the establishment of BPJPH, while Yuanitasari et al. (2024) argue that effective implementation of halal regulations requires transparent institutional communication to ensure adequate consumer protection and business compliance. The current study complements these institutional perspectives by demonstrating that entrepreneurs increasingly interact with halal governance through digital information channels before engaging directly with regulatory authorities.

These findings have important implications for improving Indonesia's digital halal governance ecosystem. Rather than focusing exclusively on strengthening regulatory enforcement, policymakers should also prioritise the quality of digital communication strategies that facilitate entrepreneurs' understanding of halal certification requirements. Search behaviour observed in this study suggests that enhancing search engine visibility, improving the structure of official websites, expanding frequently asked questions (FAQs), and providing more user-oriented procedural guidance could substantially reduce regulatory uncertainty. Consequently, digital information services should be regarded as an integral component of halal governance

because they influence entrepreneurs' initial engagement with certification policies and shape subsequent compliance behaviour.

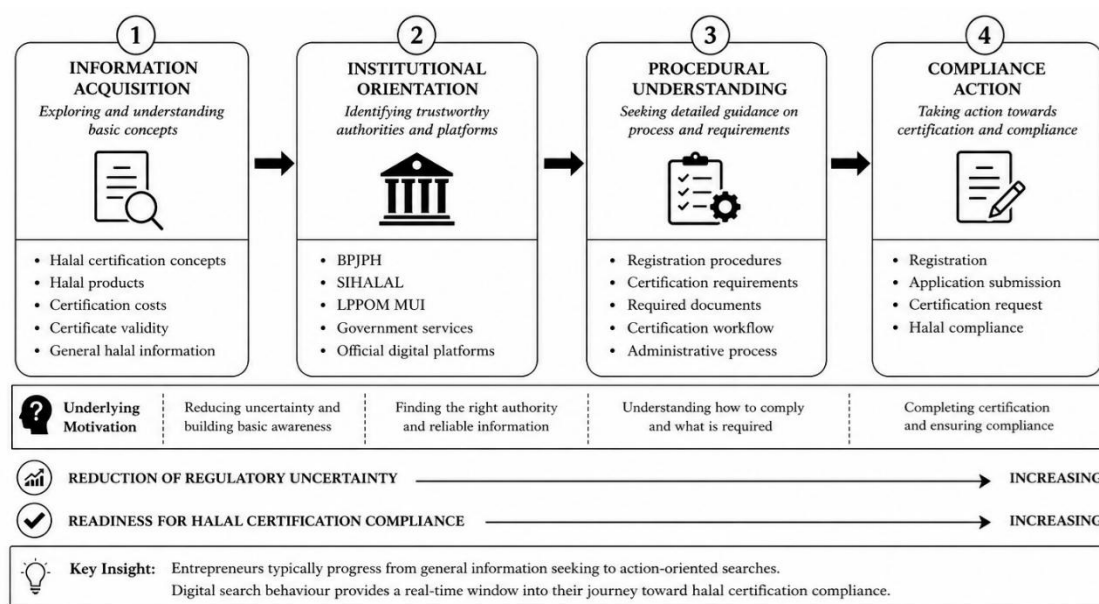
Behavioural Journey Towards Halal Certification Compliance

The integration of search intent and thematic analyses suggests that entrepreneurs' engagement with Indonesia's halal certification system follows a structured behavioural journey rather than a single-stage information search. The observed search patterns indicate that entrepreneurs progressively move from acquiring general knowledge about halal certification to identifying relevant institutions, understanding procedural requirements, and ultimately preparing to undertake certification-related actions. This sequential pattern demonstrates that online search behaviour reflects different stages of regulatory engagement, each representing a distinct level of compliance readiness.

At the initial stage, entrepreneurs primarily seek general information concerning halal certification concepts, certification costs, product eligibility, and regulatory terminology. This information acquisition stage serves as the cognitive foundation upon which subsequent compliance decisions are built. As uncertainty decreases, search behaviour gradually shifts towards institutional orientation, where entrepreneurs actively search for authoritative organisations and official digital platforms such as BPJPH and SIHALAL. This transition reflects increasing trust in formal regulatory institutions and highlights the importance of credible digital communication in supporting policy implementation. Such behavioural progression is consistent with information-seeking theory, which argues that users continuously refine their information needs as they acquire new knowledge and reduce uncertainty during the decision-making process (Case & Given, 2016).

Following institutional orientation, entrepreneurs increasingly search for procedural guidance, including certification requirements, application mechanisms, documentary preparation, and administrative workflows. The emergence of these procedural searches indicates a transition from exploratory information seeking to implementation-oriented behaviour. Finally, transactional searches associated with registration, certification applications, and other action-oriented activities represent the highest level of behavioural engagement observed in this study. Although these searches constitute a smaller proportion of the overall dataset, they provide evidence that search engines function not merely as information repositories but also as gateways facilitating entrepreneurs' progression towards formal regulatory compliance.

Figure 4. Behavioural Information-seeking Framework for Halal Certification



Source: Developed by the authors.

Based on these findings, this study proposes a Behavioural Information-Seeking Framework for Halal Certification, in which entrepreneurs' online search behaviour develops through four interconnected stages: information acquisition, institutional orientation, procedural understanding, and compliance action (Figure 5). Unlike previous studies that primarily examine halal certification through surveys of perceptions or institutional performance (Darmalaksana, 2023; Widigdo & Bayinah, 2023; Fathoni et al., 2025), the proposed framework conceptualises digital search behaviour as an observable behavioural indicator of regulatory engagement. This perspective extends the application of search-intent analysis beyond consumer behaviour and information retrieval by demonstrating its relevance for understanding compliance behaviour within Islamic economic governance. Consequently, search engine data should not merely be regarded as indicators of public interest but also as valuable behavioural evidence capable of informing policy evaluation, digital governance, and future halal certification strategies.

CONCLUSION

This study demonstrates that Google search behaviour provides valuable behavioural evidence for understanding entrepreneurs' engagement with Indonesia's mandatory halal certification system. By analysing 392 cleaned Google search queries using a search-intent approach, the findings reveal that users primarily utilise search engines to acquire regulatory knowledge, identify authoritative institutions, and understand certification procedures before undertaking

formal certification activities. The predominance of informational and navigational searches indicates that digital information seeking represents an essential early stage of regulatory engagement, while thematic analysis further highlights that certification processes, institutional information, and general halal knowledge constitute the dominant concerns among users. These findings extend the application of search-intent analysis beyond consumer behaviour by demonstrating its relevance for examining regulatory compliance within the context of Islamic economic governance.

The study contributes both theoretically and practically. Theoretically, it introduces digital search behaviour as an alternative behavioural indicator of regulatory engagement and proposes a Behavioural Information-Seeking Framework for Halal Certification, illustrating how entrepreneurs progress from information acquisition to institutional orientation, procedural understanding, and ultimately compliance action. This framework enriches the literature on digital governance, information behaviour, and halal certification by offering a behavioural perspective that complements conventional survey- and interview-based approaches. Practically, the findings suggest that improving the accessibility, clarity, and discoverability of digital regulatory information—particularly through official platforms such as BPJPH and SIHALAL—may enhance entrepreneurs' understanding of halal certification requirements and support more effective implementation of Indonesia's mandatory halal certification policy.

This study is subject to several limitations. The analysis relies exclusively on Google Keyword Planner data, which capture aggregate search behaviour without providing user-level demographic characteristics or contextual information regarding actual certification outcomes. Furthermore, the thematic classification and search-intent coding were developed within the specific context of Indonesia's halal certification system, which may limit direct generalisation to other regulatory environments. Future research could integrate multiple digital trace data sources, including Google Trends, search engine logs, or social media platforms, while combining behavioural analytics with surveys or interviews to validate the proposed framework. Comparative cross-country studies and longitudinal analyses would also provide deeper insights into how digital information-seeking behaviour evolves alongside changes in halal certification policies and institutional governance.

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