



# Exploring Halal Mobile App Usage Among Muslim University Students in A Multicultural Society

Pg Siti Rozaidah Pg Hj Idris\*   
Universiti Brunei Darussalam, Brunei Darussalam

Received : November 18, 2025

Revised : January 22, 2026

Accepted : May 7, 2026

Online : May 29, 2026

## Abstract

This study explores how Muslim university students in multicultural societies use Halal mobile applications, with particular attention to trust formation, usability, and religious identity. Employing a qualitative interpretivist approach, I conducted semi-structured email interviews with 24 Muslim students from 11 countries, including the United States, Australia, South Korea, and several European and Southeast Asian nations. Drawing on Diffusion of Innovation theory and a user-experience lens, thematic analysis suggests that Halal apps are primarily used for dietary compliance, followed by prayer-related and certification-related functions. Participants described developing hybrid trust practices by triangulating halal certification labels, community reviews, and reviewer credibility to reduce uncertainty in non-Muslim majority contexts. While the apps were frequently perceived as practical lifelines that support everyday religious observance, persistent challenges—such as outdated information, interface complexity, and limited multilingual support—undermine sustained trust. This study offers an empirically grounded account of technology-mediated halal observance among Muslim university students and provides implications for app developers, universities, and halal certification bodies operating in multicultural environments.

**Keywords:** *Halal Mobile Applications, Muslim University Students, Trust Formation, Multicultural Contexts, Technology Adoption, Digital Religiosity*

## INTRODUCTION

### The Imperative of Halal in a Digital Age

Within Islamic jurisprudence, the concept of *Halal*—derived from Arabic meaning permissible or lawful according to *Sharia*—extends far beyond dietary restrictions to encompass finance, cosmetics, pharmaceuticals, tourism, and lifestyle practices (Kamali, 2022; Mohd Fadzillah, 2022). For observant Muslims, adherence to Halal principles represents a fundamental religious obligation, integrating ethical consumption with spiritual compliance. In contemporary multicultural societies, where Muslims often constitute minority populations, maintaining Halal integrity poses significant practical challenges (Jamal & Sharifuddin, 2015; Wilkins et al., 2019).

The global Halal market, valued at approximately US\$415 billion in 2015, has surged to an estimated US\$7 trillion annually, encompassing food, travel, finance, and pharmaceuticals (Ahmed, 2022; Petiwala et al., 2021). Notably, this market extends beyond Muslim consumers to include health-conscious non-Muslims who associate Halal certification with hygiene, ethical animal welfare, and quality assurance (Ahmed, 2022; Jamal & Sharifuddin, 2015). This expansion has catalysed technological innovation, particularly mobile applications designed to assist Muslims in navigating Halal-compliant options within predominantly non-Muslim environments (Gutcher, 2013; Ng, 2017). Parallel to the growth of mobile apps, recent research has emphasised the need for systematic halal education and workforce development to support the industry's expansion (Idris, 2024a, Idris, 2024b), as well as the persistent certification challenges faced by small food

**Copyright Holder:**

Idris. (2026)

Corresponding author's email: [rozaidah.idris@ubd.edu.bn](mailto:rozaidah.idris@ubd.edu.bn)

**This Article is Licensed Under:**



vendors (Idris et al., 2024). Moreover, cultural values and leadership practices within public organisations have been shown to influence transparency, decision-making, and trust—factors that are equally relevant to the governance of halal certification and digital information systems (Idris, 2021).

### Research Gap and Purpose

Despite the proliferation of Halal mobile applications—such as Muslim Pro, Halal Navi, HalalDish, and Have Halal Will Travel—a significant knowledge gap persists regarding their actual usage patterns, perceived effectiveness, and limitations among specific user demographics. Existing literature has focused predominantly on technical development (Kartiwi et al., 2018; Leman & Salim, 2020), market potential (Ng, 2017; Petiwala et al., 2021), or broad acceptance models (Suhartanto et al., 2023). What remains underexamined is the *lived experience* of Muslim university students—a digitally native, geographically mobile, and identity-negotiating population—as they employ these apps to reconcile religious practice with multicultural realities.

Prior Technology Acceptance Model (TAM) and Unified Theory of Acceptance and Use of Technology (UTAUT) applications have quantified usability and perceived usefulness but have not adequately captured the socio-cultural and emotional dimensions of Halal app usage: trust formation in certification accuracy, identity affirmation, peer influence dynamics, and the intersection of digital tools with religious identity in pluralistic settings. Furthermore, while recent comparative studies have examined halal education systems in Brunei, Malaysia, and Japan (Idris, 2024a) and identified human resource development gaps in the halal industry (Idris, 2024b), no study has yet explored how university students—as both consumers and future halal professionals—engage with halal mobile technologies. The cultural and procedural hurdles documented in halal certification for Japanese restaurants—such as lack of standardisation, high costs, and consumer distrust—mirror the challenges students encounter when trusting app-based halal information (Idris, 2024c). This study directly addresses that gap by posing the following research questions:

1. How do Muslim university students in multicultural societies use Halal mobile applications in their daily lives?
2. What motivations, challenges, and experiential factors shape their adoption and continued usage?
3. How do design features, information credibility, and cultural context influence user satisfaction and reliance?

### Theoretical Framework: An Integrated Model

This study integrates two complementary theoretical lenses. First, Rogers' (1987) Diffusion of Innovation (DOI) Theory provides a macro-level framework for understanding adoption patterns across a population. DOI categorises adopters (innovators, early adopters, early majority, late majority, laggards) and identifies innovation characteristics—relative advantage, compatibility, complexity, trialability, and observability—that predict diffusion success. In this context, Halal apps represent innovations whose adoption among students is shaped by their perceived advantage over traditional information sources (e.g., word-of-mouth, community networks) and compatibility with Islamic values and digital lifestyles.

Second, the Feedback and User Experience (UX) Framework offers a micro-level analytical lens focused on interface design, user feedback integration, and satisfaction. Unlike purely technical evaluations, this framework privileges user-centred design principles and iterative improvement based on lived experience. By combining DOI's structural perspective with UX's experiential focus, this study captures both why students adopt Halal apps (innovation characteristics, social

influence) and how their ongoing experiences (usability, trust, feature utility) shape sustained engagement. This integrated model addresses a limitation of prior TAM/UTAUT studies by explicitly incorporating religious identity and multicultural context as moderating variables. The importance of context—particularly national and organisational culture—has been strongly emphasised in leadership research, where cultural values such as face preservation (*menjaga air muka*) and deference to seniority (*tua menuakan*) can constrain transparency and proactive behaviour (Idris, 2021). These same cultural dynamics may influence how students from different backgrounds trust and use halal mobile apps.

## LITERATURE REVIEW

### Multiculturality and Halal Consumption

Multicultural societies—characterised by the coexistence of diverse cultural, ethnic, and religious groups (Law, 2014)—present both opportunities and challenges for Halal observance. Jamal and Sharifuddin (2015) demonstrated that the perceived value of Halal labelling is significantly influenced by religious identity and cultural exposure, with Muslims in multicultural settings placing greater emphasis on certification authenticity. Extending this, Wilkins et al. (2019) found that among non-Muslim consumers, cosmopolitanism and religious identity positively correlated with favourable Halal product judgments, suggesting that multicultural environments can foster interfaith understanding and Halal market expansion.

However, this inclusivity is not automatic. Mukherjee (2014) cautioned that Halal acceptance reflects a society's genuine respect for religious diversity rather than mere market accommodation. For Muslim students in non-Muslim majority countries—such as those in the sample from the US, Australia, South Korea, and Switzerland—maintaining Halal practices requires proactive information-seeking, community networking, and increasingly, technological assistance. This study posits that Halal mobile apps operate as *boundary objects* (Star & Griesemer, 1989), facilitating religious compliance across cultural boundaries while simultaneously affirming users' Islamic identity in secular or religiously plural spaces. This perspective aligns with comparative findings on halal education across different national contexts: Brunei, Malaysia, and Japan each exhibit distinct approaches to halal knowledge dissemination, yet all recognise the centrality of digital tools and trained human capital (Idris, 2024a). Furthermore, the cultural value of *awar galat* (shame and humility) observed in Bruneian public sector organisations can lead to reluctance in speaking up or challenging authority (Idris, 2021); a similar reluctance may affect students' willingness to question app-based halal information or report inaccuracies.

### Trends and Issues in Halal Mobile Applications

The developmental trajectory of Halal mobile apps reflects both technological innovation and persistent challenges. Gutcher (2013) documented Sato's Halal food finder app, created in response to a Muslim friend's difficulties in Tokyo. Features included restaurant locators, online grocery ordering, and user-generated content. Similarly, Ng (2017) analysed "Have Halal Will Travel" and "Halal Dining Club," apps capitalising on the growing Muslim travel market. These apps demonstrate commercial viability and community utility.

Nevertheless, critical issues recur across the literature. Leman and Salim (2020) critiqued existing apps for outdated information, lack of interactivity, and poor interface design, proposing an interactive 3D modelling approach. Kartiwi et al. (2018) developed HalalDish, employing optical character recognition (OCR) to scan product labels for non-Halal ingredients, though accuracy issues due to lighting and font variations persisted. Nisa and Sujono (2017) raised a more fundamental concern regarding South Korea's "Halal Korea" app, arguing that symbolic compliance (e.g., "Pork Free" labelling) may substitute for rigorous certification, potentially misleading users.

More recent scholarship has connected Halal app development to broader industry trends. [Bux et al. \(2022\)](#) reviewed blockchain's potential to enhance Halal supply chain transparency, while [Mohd Fadzillah \(2022\)](#) projected the global Halal market reaching US\$9.71 trillion by 2025, driven by Muslim population growth, technological innovation, and sector diversification. [Ahmed \(2022\)](#) argued that COVID-19 heightened consumer focus on health and safety, increasing Halal's appeal among non-Muslims. Despite these advancements, [Petiwala et al. \(2021\)](#) emphasised that mobile applications must address fundamental challenges: certification verification, user awareness, and cross-cultural usability.

Importantly, empirical studies on halal certification implementation have revealed that small-scale food vendors—including stall owners—frequently face bureaucratic hurdles, lack of awareness, and financial constraints that discourage certification ([Idris et al., 2024](#)). These same barriers may influence how students perceive and trust halal information provided by mobile apps, as certification authenticity is a recurring concern. In the Japanese context, restaurants seeking halal certification struggle with complex procedures, multiple certifying bodies, and high costs, leading to consumer scepticism ([Idris, 2024c](#)). Students using halal apps in multicultural societies may encounter analogous problems when the apps aggregate data from unverified or poorly regulated certifiers.

Critically, no existing study has systematically examined Halal mobile app usage *from the perspective of Muslim university students as a distinct demographic*. While Halal tourism apps have received attention, the daily, place-based needs of students—balancing academic demands, limited budgets, social integration, and religious identity—remain underexplored. This study directly addresses that gap.

## RESEARCH METHOD

### Research Design and Philosophical Orientation

This study employed a qualitative, interpretivist research design, recognising that Halal app usage is shaped by subjective experiences, cultural contexts, and individual meaning-making processes. Unlike quantitative approaches seeking generalisable prediction, this study prioritised depth, contextual understanding, and participant voice.

### Sampling and Recruitment

A purposive sampling strategy was employed to ensure participants met specific inclusion criteria: (a) self-identified as Muslim, (b) currently enrolled as a university student (undergraduate or postgraduate), (c) resided in a multicultural society (defined as a country where Muslims comprise less than 50% of the population or where significant religious diversity exists), and (d) had used at least one Halal-related mobile application within the past six months.

Participants were recruited through multiple channels: university Muslim student associations (via email announcements), social media platforms (Instagram and Twitter posts targeting Muslim student networks), and snowball sampling (initial participants referring eligible peers). Recruitment materials emphasised voluntary participation, confidentiality, and the option to withdraw without penalty.

The final sample comprised 24 participants from 11 countries: United States (n=4), Australia (n=3), United Kingdom (n=3), South Korea (n=2), Thailand (n=2), Malaysia (n=3), Brunei (n=2), Vietnam (n=1), Switzerland (n=2), Singapore (n=1), and Oman (n=1). Participant ages ranged from 19 to 31 years (M=23.8); 14 identified as female, 10 as male. Academic levels included undergraduate (n=16) and master's (n=8). Eighteen participants were international students in their country of residence; six were domestic students in multicultural settings.

### **Data Collection: Semi-Structured Email Interviews**

Given the geographically dispersed sample, semi-structured email interviews were conducted over a four-month period (September–December 2022). This method offered several advantages: (a) participants could respond at their convenience, accommodating time zone differences, (b) written responses provided a verbatim transcript requiring no transcription, (c) participants had time for reflective, considered answers rather than pressured real-time responses, and (d) the method reduced interviewer bias by eliminating vocal or non-verbal cues (Meho, 2006).

The interview guide (see Appendix A) contained 12 open-ended questions organised around four domains: (1) frequency and contexts of Halal app usage, (2) motivations and perceived benefits, (3) challenges and negative experiences, (4) feature preferences and improvement suggestions. Participants received questions in three batches (four questions per batch) over two weeks, allowing manageable response intervals. Follow-up clarification questions were sent as needed. Responses averaged 450 words per participant, yielding approximately 10,800 words of data.

### **Data Analysis**

Thematic analysis, following Braun and Clarke's (2006) six-phase procedure, was conducted. Phase 1: Familiarisation—responses were read repeatedly, and initial observations were recorded. Phase 2: Initial coding—a research assistant and I independently coded five randomly selected responses using NVivo 12, achieving an inter-coder agreement of 84% (Cohen's  $\kappa = 0.79$ ). Disagreements were resolved through discussion. Phase 3: Theme generation—codes were grouped into candidate themes. Phase 4: Theme review—themes were checked against coded extracts and full datasets. Phase 5: Theme definition—themes were refined, named, and defined. Phase 6: Writing—findings were written with participant quotes. An audit trail documented all analytical decisions.

### **Researcher Positionality and Reflexivity**

I am an Assistant Professor in Leadership at Universiti Brunei Darussalam and Lead Editor of the Springer Nature volume *The Halal Industry in Asia: Perspectives from Brunei Darussalam, Malaysia, Japan, Indonesia and China*. I hold a PhD in Management Learning and Leadership from Lancaster University Management School, United Kingdom, and I currently lead a university-funded research grant on the halal industry in Brunei Darussalam and other Asian countries. My prior work includes comparative studies of halal education systems (Idris, 2024a), human resource development in the halal industry (Idris, 2024b), certification challenges among small-scale food vendors (Idris et al., 2024), the complexities of halal certification in Japanese restaurants (Idris, 2024c), and the influence of cultural values on leadership and organisational behaviour in the Bruneian public sector (Idris, 2021). This research trajectory has shaped my understanding of halal compliance as a multi-level phenomenon involving education, workforce training, certification infrastructure, digital technologies, and cultural dynamics. As a Muslim woman from a multicultural Southeast Asian nation, I bring both insider knowledge of halal practices and awareness of the diversity of Muslim experiences globally. Throughout analysis, I maintained a reflexive journal to bracket assumptions—particularly the tendency to assume universal halal app utility. Peer debriefing with a non-Muslim qualitative research methodologist provided additional critical perspective.

### **Ethical Considerations**

Ethical approval was obtained from the Universiti Brunei Darussalam Research Ethics Committee. All participants provided informed consent, were assured of anonymity, and were assigned pseudonyms (P1–P24). Data were stored on password-protected university servers.

### **FINDINGS AND DISCUSSION**

Eight thematic categories emerged from the analysis, each supported by verbatim participant quotes. These themes directly answer the research questions regarding usage patterns, motivations, challenges, and experiential factors.

#### **Theme 1: Prevalence and Diversity of Halal App Usage**

All 24 participants reported using Halal-related mobile applications, with 22 using them daily or several times per week. The most frequently mentioned apps were Muslim Pro (n=18), Halal Navi (n=9), HalalDish (n=5), and Mufko (n=4). Usage extended across multiple functions:

*“I use Muslim Pro every day—multiple times, actually. Prayer times change depending on where I am in the US, and the app adjusts automatically. Without it, I’d miss prayers or have to constantly search online.” (P7, female, USA)*

*“When I first moved to Seoul, I didn’t know where to find Halal chicken. My Korean friend actually showed me Halal Navi. Now I use it maybe 3–4 times a week, especially when exploring new neighbourhoods.” (P12, male, South Korea)*

These findings align with [Rogers’ \(1987\)](#) DOI categorisation: participants function as *early adopters* relative to older generations but as *early majority* within their peer group, suggesting that Halal apps are transitioning from innovation to mainstream acceptance among young Muslims.

#### **Theme 2: Primary Motivations—Dietary Compliance and Religious Identity**

The dominant motivation for app usage was locating Halal food (n=23 participants), followed by prayer time reminders (n=20), Qibla direction (n=17), and Halal-certified product identification (n=14). Beyond practical utility, participants articulated identity-affirmation functions:

*“It’s not just about finding food. When I open the app and see hundreds of Halal options listed, I feel... seen. Like my identity as a Muslim matters in this city. That sounds dramatic, but it’s true.” (P3, female, Australia)*

*“In Thailand, being Muslim is sometimes... complicated. The app gives me confidence that I’m not alone. Other Muslims have reviewed these restaurants, so I trust them more than official certification, actually.” (P15, male, Thailand)*

This finding extends [Suhartanto et al. \(2023\)](#) by demonstrating that Halal apps serve *socio-emotional* functions beyond transactional information retrieval. The apps become digital spaces for belonging, reducing the isolation Muslim students may experience in multicultural, non-Muslim majority settings. This sense of digitally mediated belonging parallels the community-building function of halal education and certification awareness programmes highlighted in comparative studies of Brunei, Malaysia, and Japan ([Idris, 2024a](#)). In parallel, research on cultural values in Bruneian organisations has shown that the desire to maintain harmony (*menjaga air mua*) can suppress the voicing of concerns; conversely, the anonymity of digital apps may empower students

to share honest reviews without fear of confrontation (Idris, 2021).

### **Theme 3: Trust Dynamics—Community Reviews Versus Official Certification**

A striking finding involved participants' trust calibration. While official Halal certification was valued, many expressed greater confidence in user-generated reviews and community feedback:

*"There's this one restaurant near my campus in London that has a Halal certificate on the wall. But when I checked the app, several reviews said the certificate had expired two years ago. The app saved me from making a mistake."* (P9, male, UK)

*"Official certification is important, but... who checks it? In Australia, I trust the app reviews more because they're from real Muslims like me who have eaten there recently."* (P18, female, Australia)

Conversely, some participants expressed scepticism about review authenticity:

*"Anyone can write a review. I've seen fake positive reviews on Halal apps, probably from restaurant owners. So I look for reviewers with history—people who have reviewed multiple places. That builds trust."* (P21, male, Singapore)

This reveals a *hybrid verification ecology* in which users triangulate official certification, peer reviews, and reviewer reputation—a finding absent from previous technical literature (e.g., Kartiwi et al., 2018; Leman & Salim, 2020). App developers should consider incorporating reviewer reputation scores and verification badges. The trust issues expressed by students mirror the certification credibility concerns documented among halal stall owners in Brunei, who often doubt whether certified products genuinely meet halal standards (Idris et al., 2024). Similarly, Japanese restaurants and consumers face distrust due to the proliferation of unregulated certifying bodies and fraudulent halal claims (Idris, 2024c).

### **Theme 4: Interface Design—Usability Successes and Failures**

Positive experiences were associated with intuitive navigation, clear filtering options, and visual maps. Negative experiences stemmed from cluttered interfaces, slow loading, and feature bloat:

*"Halal Dish is great in theory—scanning barcodes to check ingredients. But in practice, it fails maybe 40% of the time because of bad lighting or weird fonts on packaging. I stopped using it after two weeks."* (P23, female, Brunei)

*"Muslim Pro added so many features... social media, news, Q&A. I just want prayer times and Qibla. Now the app feels overwhelming. I almost deleted it until I found a setting to hide the extra features."* (P5, female, USA)

This supports Leman and Salim's (2020) critique of feature bloat and poor usability. The UX Framework suggests that developers should prioritise *core functionality* for target demographics (students) and offer modular feature selection.

**Theme 5: Language and Cultural Accessibility Barriers**

Multilingual support emerged as a critical gap, particularly for students in non-Arabic-speaking or non-English-majority countries:

*"I'm from Vietnam, studying in Switzerland. The Halal apps I found are in English, which is fine, but restaurant information is often in German or French. The app doesn't translate labels or menus. So I still struggle."* (P22, male, Switzerland)

*"My mother only speaks Malay. She asked me to find a Halal app for when she visits me in Melbourne. I couldn't find one with full Malay interface. That's a real barrier for older or less English-fluent Muslims."* (P14, female, Australia)

Only seven participants reported using apps with language options beyond English and Arabic. This represents a significant design oversight, given that the global Muslim population is highly multilingual. Language barriers in digital halal tools reflect a broader pattern observed in halal training and education: without localised content and multilingual delivery, even well-intentioned initiatives fail to reach diverse populations (Idris, 2024b). Moreover, cultural values such as *awar galat* (fear of appearing boastful or rude) may discourage users from requesting language improvements or reporting errors (Idris, 2021).

**Theme 6: Information Accuracy and Currency as Persistent Challenges**

Despite the value participants placed on Halal apps, concerns about outdated or incorrect information were widespread:

*"I once travelled 30 minutes by bus in Oman to a restaurant the app said was Halal-certified. When I arrived, it was closed permanently. The listing hadn't been updated in over a year."* (P2, male, Oman)

*"In South Korea, some apps list restaurants as 'Muslim-friendly' but that just means they serve rice and vegetables. It doesn't mean the meat is Halal. The categories are misleading."* (P12, male, South Korea)

This echoes Nisa and Sujono's (2017) critique of symbolic Halal labelling without substantive compliance. Participants suggested that apps should display *certification expiry dates*, *last-verified timestamps*, and *user report functions* for closed or non-compliant establishments. The need for up-to-date, authoritative halal information is not unique to mobile apps; similar demands have been reported in human resource development for halal auditors and certification officers (Idris, 2024b). The fragmented and sometimes contradictory certification standards across different halal certifying bodies—a major challenge in Japan (Idris, 2024c)—also complicates the task of app developers, who must decide which certifications to display and how to rank them.

**Theme 7: Peer Recommendations as Adoption Catalysts**

Peer influence was a powerful adoption driver, consistent with Rogers' (1987) emphasis on social networks in diffusion:

*"I wouldn't have downloaded Halal Navi if my best friend hadn't insisted. She showed me how it worked, and we reviewed restaurants together. Now it's a social thing—we send each other new Halal spots."* (P8, female, Malaysia)

*“When I moved to the UK, the Islamic society at my university gave us a welcome pack with recommended apps. That’s how I learned about Mufko. Without that, I would have felt lost.” (P19, male, UK)*

This finding suggests that developers should incorporate *social features*—sharing lists, group reviews, campus-specific recommendations—to leverage peer networks. Targeting university Islamic societies for promotional partnerships may yield high adoption rates.

### Theme 8: Desired Improvements and Future Expectations

Participants offered concrete suggestions for app enhancement, which are summarised in Table 1.

**Table 1.** Participant-Recommended Improvements for Halal Mobile Apps

<b>Improvement Category</b>	<b>Specific Suggestions (with participant examples)</b>	<b>Frequency (n=24)</b>
<b>Search and Filter Enhancement</b>	<i>“Filter by price, distance, cuisine type, and certification body.” (P4, USA); “Sort by newest reviews, not just highest rated.” (P11, UK)</i>	19
<b>User-Generated Content Integration</b>	<i>“Allow photo uploads of menus and certificates.” (P16, Thailand); “Flag fake reviews or paid promotions.” (P21, Singapore)</i>	17
<b>Multilingual Expansion</b>	<i>“Full interface in Turkish, Urdu, French, German, Malay.” (P14, Australia); “Translate restaurant names and dish descriptions.” (P22, Switzerland)</i>	16
<b>Improved Verification Mechanisms</b>	<i>“Show certificate expiry dates.” (P9, UK); “Last verified timestamp for each listing.” (P18, Australia); “Report closed or changed restaurants.” (P2, Oman)</i>	20
<b>Simplified, Modular Interfaces</b>	<i>“Let me choose which features appear on the home screen.” (P5, USA); “Remove social media features—I just need food and prayer times.” (P6, Canada)</i>	14

Looking forward, 21 participants anticipated increased reliance on Halal apps, citing growing smartphone penetration, AI-powered personalisation, and integration with food delivery platforms. However, several cautioned against over-automation:

*“An app is a tool, not a substitute for your own knowledge. I still check ingredients myself. The app just helps me narrow options.” (P13, female, USA)*

## DISCUSSION

### Synthesising Findings: Toward a Contextual Model of Halal App Adoption

Integrating the findings within the DOI and UX frameworks yields a contextual model specific to Muslim university students in multicultural societies. Consistent with DOI, adoption is driven by *relative advantage*—apps offer clear benefits over traditional knowledge sources (community networks, random exploration). *Compatibility* with Islamic values and digital-native lifestyles is high. However, *complexity* (cluttered interfaces) and *observability* (difficulty assessing information accuracy) remain barriers.

The UX framework highlights that user satisfaction depends not merely on feature availability but on *trustworthiness* of information, *ease of language access*, and *social accountability mechanisms* (user reviews, verification badges). Crucially, participants demonstrated *strategic trust calibration*: rather than accepting either official certification or user reviews uncritically, they triangulated multiple signals. This finding extends the technology acceptance literature (Suhartanto et al., 2023) by showing that in high-stakes contexts (religious compliance), users develop sophisticated epistemic practices to assess information credibility. These insights complement prior research on halal certification challenges, where stall owners similarly expressed distrust in opaque or outdated certification processes (Idris et al., 2024). Both studies point to a shared need for transparent, verifiable, and user-accessible halal information systems. Furthermore, the cultural constraints on transparency and proactive behaviour identified in Bruneian public sector leadership—such as fear of losing face (*menjaga air maa*) and deference to seniority (*tua menuakan*)—may also influence how students from hierarchical cultures interact with app-based information (Idris, 2021).

### Comparison with Prior Literature

This study both confirms and challenges existing research. Confirming Petiwala et al. (2021) and Ahmed (2022), it finds that Halal apps address genuine needs for Muslims in non-majority settings. Confirming Kamali (2022), it observes that Halal considerations increasingly span multiple life domains (food, prayer, travel, shopping). However, this study challenges the assumption in technical development papers (e.g., Leman & Salim, 2020; Kartiwi et al., 2018) that improving features alone will drive adoption. The findings emphasise *trust infrastructure* (verification, transparency, user accountability) as equally critical. Without trust, even technically sophisticated apps will be abandoned.

The study also extends Nisa and Sujono's (2017) critique of symbolic Halal labelling by documenting how such ambiguities cause real-world consequences—wasted time, unintentional non-compliance, and eroded confidence in digital tools. Furthermore, the study aligns with comparative halal education research (Idris, 2024a), which found that countries with more robust halal knowledge infrastructures (e.g., Malaysia) also exhibit higher consumer confidence in halal digital tools, suggesting a positive feedback loop between education, certification, and technology adoption. The findings also echo those from Japan, where the absence of a centralised halal certification authority and the presence of numerous unregulated certifiers have created a “wild west” environment that undermines consumer trust (Idris, 2024c).

### Implications for Theory

This study contributes to DOI by demonstrating that *perceived risk* (of consuming non-Halal food) moderates the relationship between innovation characteristics and adoption. High perceived risk increases reliance on peer recommendations and verification features. For UX theory, the study demonstrates that *trust* functions as a meta-usability construct: even intuitive interfaces fail if users doubt information accuracy. Future technology acceptance models should

incorporate religious identity and context-specific trust calibration as explicit variables.

### **Implications for Practice**

For app developers: Prioritise (a) verification mechanisms (expiry dates, timestamps, user reports), (b) multilingual interfaces (starting with top ten Muslim languages), (c) modular design allowing feature selection, (d) social accountability features (reviewer reputation scores). Avoid feature bloat.

For university Islamic societies and chaplaincies: Provide curated app recommendations in welcome packs, leveraging peer networks for adoption. Offer training sessions on critically evaluating Halal app information. Drawing on human resource development findings (Idris, 2024b), universities could also integrate halal digital literacy modules into orientation programmes, thereby preparing students to become informed halal consumers and future industry professionals.

For policymakers and certification bodies: Consider partnering with popular apps to provide verified certification data via API. Transparency about certification scope and expiry dates reduces ambiguity for consumers. As noted in the analysis of Brunei's halal certification system (Idris et al., 2024) and the Japanese halal certification landscape (Idris, 2024c), reducing bureaucratic friction, standardising processes, and creating a single reliable source of truth would benefit both vendors and consumers. Moreover, public sector leaders could draw lessons from cultural value research (Idris, 2021) to design policies that encourage transparency without causing loss of face.

### **CONCLUSION**

This study examined how Muslim university students in multicultural societies use, experience, and evaluate Halal mobile applications. Through thematic analysis of 24 semi-structured email interviews across 11 countries, eight key themes emerged. Halal apps serve as essential daily tools for dietary compliance, prayer observance, and identity affirmation. Participants highly value these apps but face persistent challenges: information inaccuracy, language barriers, interface complexity, and ambiguous certification labelling. Crucially, users develop hybrid trust strategies, triangulating official certification, peer reviews, and reviewer reputation. The study contributes an integrated DOI-UX model tailored to this demographic, emphasising trust infrastructure over mere feature expansion.

For research, this study opens questions for future investigation: longitudinal studies of trust evolution, comparative studies across religious traditions (e.g., Kosher apps), and quantitative testing of the contextual model proposed here. For practice, actionable recommendations for developers, universities, and certification bodies are provided. Collectively, this study and my prior work (Idris, 2021; Idris, 2024a, 2024b, 2024c; Idris et al., 2024) underscore a consistent message: halal assurance—whether via mobile apps, education, certification, or leadership practices—must be transparent, user-centred, culturally aware, and continuously validated to maintain trust in an increasingly digital and multicultural world.

### **LIMITATION & FURTHER RESEARCH**

Several limitations constrain this study's generalisability. First, the sample, while diverse across 11 countries, is limited to university students—a relatively educated, technologically proficient, and young demographic. Findings may not extend to older Muslims, less educated populations, or those in rural multicultural settings. Second, the study relied on self-reported data, subject to recall bias and social desirability effects (participants may overreport app usage to align with religious identity norms). Third, the email interview method, while facilitating geographic

diversity, precluded observation of actual app usage behaviours or real-time problem-solving. Future research should employ mixed methods: app usage log data (objective frequency), in-person think-aloud protocols (usability testing), and focus groups (community dynamics). Fourth, cross-country comparability was limited by small subsample sizes; future studies should recruit larger, nationally representative samples.

Additionally, this study did not examine non-Muslim Halal app users—a growing segment per Ahmed (2022). Investigating their motivations, trust assessments, and feature preferences could inform inclusive design. Longitudinal research could track whether initial trust in Halal apps erodes over time due to negative experiences and how developers regain user confidence after information failures. Finally, future research could directly link halal mobile app usage to halal certification systems and educational interventions, building on the comparative framework developed in earlier work (Idris, 2024a; Idris et al., 2024). Specifically, cross-national comparative studies examining how different regulatory and cultural contexts (e.g., Japan’s decentralised certification vs. Malaysia’s centralised system) shape student trust in digital halal tools would be valuable (Idris, 2024c; Idris, 2021).

## REFERENCES

- Ahmed, H. M. (2022). *Why has halal food become popular among non-Muslims?* The Halal Times. <https://www.halaltimes.com/why-has-halal-food-become-popular-among-non-muslims-too/>
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77–101. <https://doi.org/10.1191/1478088706qp063oa>
- Bux, C., Varese, E., Amicarelli, V., & Lombardi, M. (2022). Halal food sustainability between certification and blockchain: A review. *Sustainability*, 14(4), Article 2152. <https://doi.org/10.3390/su14042152>
- Gutcher, L. (2013, August 28). *New app shows where to eat halal food in a non-Muslim nation.* The National. <https://www.thenationalnews.com/business/new-app-shows-where-to-eat-halal-food-in-a-non-muslim-nation-1.295342>
- Idris, P. S. R. (2021). Cultural values and its influence on the enactment of leadership in public sector organisations: A case research in Brunei. *International Journal of Asian Business and Information Management*, 12(4), 1–19. <https://doi.org/10.4018/IJABIM.20211001.0a1>
- Idris, R. (2024a). Addressing gaps and issues of human resource development in the halal industry in Brunei Darussalam. In R. Idris (Ed.), *The halal industry in Asia: Perspectives from Brunei Darussalam, Malaysia, Japan, Indonesia and China* (Chap. 2). Springer Nature.
- Idris, R. (2024b). Halal education and knowledge in Brunei Darussalam, Malaysia and Japan: A comparative study. In R. Idris (Ed.), *The halal industry in Asia: Perspectives from Brunei Darussalam, Malaysia, Japan, Indonesia and China* (Chap. 4). Springer Nature.
- Idris, R. (2024c). Navigating halal certification challenges in Japanese restaurants: Insights and strategies for success. *Journal of Halal Science, Industry, and Business*, 2(1), 1–14.
- Idris, R., Adli, A., Ahmad, A. S. H., & Rosli, N. N. (2024). Challenges in the halal certification process from the perspective of halal stall owners in Brunei Darussalam. In R. Idris (Ed.), *The halal industry in Asia: Perspectives from Brunei Darussalam, Malaysia, Japan, Indonesia and China* (Chap. 6). Springer Nature.
- Jamal, A., & Sharifuddin, J. (2015). Perceived value and perceived usefulness of halal labeling: The role of religion and culture. *Journal of Business Research*, 68(5), 933–941. <https://doi.org/10.1016/j.jbusres.2014.09.020>
- Kamali, M. H. (2022). *Evolution of the halal industry and lifestyle in Southeast Asia.* FULCRUM. <https://fulcrum.sg/evolution-of-the-halal-industry-and-lifestyle-in-southeast-asia/>

- Kartiwi, M., Gunawan, T. S., Anwar, A., & Fathurohmah, S. S. (2018). Mobile application for halal food ingredients identification using optical character recognition. In *Proceedings of the 2018 IEEE 5th International Conference on Smart Instrumentation, Measurement and Applications (ICSIMA)*. IEEE. <https://doi.org/10.1109/ICSIMA.2018.8688794>
- Law, I. (2014). Theories of multiculturalism: An introduction. *Ethnic and Racial Studies*, 37(10), 1963–1966. <https://doi.org/10.1080/01419870.2014.904750>
- Leman, A. P., & Salim, R. (2020). Interactive halal mobile application based on 3D modelling approach. *Journal of Halal Studies*, 1(2), 32–41.
- Meho, L. I. (2006). E-mail interviewing in qualitative research: A methodological discussion. *Journal of the American Society for Information Science and Technology*, 57(10), 1284–1295. <https://doi.org/10.1002/asi.20416>
- Mohd Fadzillah, K. (2022). *The rise of the halal industry and tech innovations in 2022*. Ethis Blog. <https://ethis.co/blog/rise-halal-industry-tech-innovations-2022/>
- Muhammad, A., Zainuddin, A., & Suzana, H. (2016). Issues and challenges in retail food supply chain from the perspective of halal logistics: A literature review.
- Mukherjee, S. (2014). Global halal: Meat, money, and religion. *Religions*, 5(1), 22–75. <https://doi.org/10.3390/rel5010022>
- Ng, K. (2017, January 25). *2 apps, 1.6 billion Muslims: How these startups are tapping the halal market*. Tech Wire Asia. <https://techwireasia.com/01/2017/2-apps-1-6-billion-muslims-startups-tapping-halal-market/>
- Nisa, F. K., & Sujono, F. K. (2017). Islamic branding as communication strategy of halal tourism promotion in non-Muslim country. In *Proceedings of the 4th Conference on Communication, Culture and Media Studies* (p. 7). Yogyakarta.
- Petiwala, F. F., Nawazish, H. N., Shukla, V. K., Sharma, R., & Nanda, I. (2021). Halal food benefits and challenges: A mobile application based technical review. In *2021 International Conference on Advance Computing and Innovative Technologies in Engineering (ICACITE)* (pp. 139–144). IEEE. <https://doi.org/10.1109/ICACITE51222.2021.9404722>
- Rogers, E. M. (1987). The diffusion of innovations perspective. In N. D. Weinstein (Ed.), *Taking care: Understanding and encouraging self-protective behavior* (pp. 79–94). Cambridge University Press.
- Star, S. L., & Griesemer, J. R. (1989). Institutional ecology, 'translations' and boundary objects: Amateurs and professionals in Berkeley's Museum of Vertebrate Zoology, 1907–39. *Social Studies of Science*, 19(3), 387–420. <https://doi.org/10.1177/030631289019003001>
- Suhartanto, D., Djatnika, T., Suhaeni, T., & Setiawati, L. (2023). Halal trust during the COVID-19 outbreak: The role of quality, perceived benefit and health risk evidence from mobile food purchasing. *Journal of Islamic Accounting and Business Research*, 14(5), 767–781. <https://doi.org/10.1108/JIABR-09-2021-0256>
- Wilkins, S., Butt, M. M., Shams, F., & Pérez, A. (2019). The acceptance of halal food in non-Muslim countries: Effects of religious identity, national identification, consumer ethnocentrism and consumer cosmopolitanism. *Journal of Islamic Marketing*, 10(4), 1308–1331. <https://doi.org/10.1108/JIMA-11-2017-0132>
- Zulkifli, A. M. (2019). *'70 PCT non-Muslim owned' halal industry: New website helps Malaysians 'buy Muslim first'*. Salaam Gateway. <https://salaamgateway.com/story/70-pct-non-muslim-owned-halal-industry-new-website-helps-malaysians-buy-muslim-first>