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Where Technology Meets Faith: A Systematic Review and Cultural Reinterpretation of UTAUT2 Framework in Muslim Societies

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Abstract

The extended Unified Theory of Acceptance and Use of Technology (UTAUT2) has emerged as a prominent underpinning theory for understanding users' technology adoption in Islamic cultural contexts. However, the existing literature remains fragmented, and empirical findings are inconsistent. The purpose of this study is to systematically review the extant literature on UTAUT2 in Islamic technology settings and to critically evaluate its theoretical deployment, contextual adaptations, and empirical performance, with the aim of identifying opportunities to advance future research in this area. Guided by the PRISMA protocol and theories–contexts–characteristics–methodologies (TCCM) framework, this study included 38 relevant journal articles retrieved from the Scopus database. Findings indicate that few studies integrate complementary theories to extend UTAUT2, and the research landscape is heavily concentrated in Asian countries. A cross-sectional design dominates the research approach, with PLS-SEM emerging as the prevailing data analysis strategy. The relevance of the core UTAUT2 determinants is mixed. Habit and performance expectancy frequently predict behavioral intention, whereas effort expectancy, social influence, hedonic motivation, facilitating conditions, and price value often exhibit insignificant effects. Trust, religiosity, and compliance are the most commonly incorporated additional constructs. The boundary conditions of associations' UTAUT2 have largely been overlooked. This review is among the earliest studies of UTAUT2 in Muslim cultural contexts. This study reveals important strengths and shortcomings of existing UTAUT2-based studies in this particular setting. Advancing beyond a descriptive review, this study consolidates current knowledge, identifies methodological and theoretical gaps, and outlines a research agenda to strengthen the Islamic-based UTAUT2 framework.

Keywords: society; religiosity; UTAUT; UTAUT2; Islamic-oriented technology; systematic literature review; TCCM

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1. Introduction

The established technology acceptance models have undergone substantial advancements in academic research, deepening understanding of the forces and barriers that drive

users' technology adoption [1,2]. Among the comprehensive and influential frameworks developed to explain why users adopt new technologies is the extended Unified Theory of Acceptance and Use of Technology (UTAUT2) [3,4]. The model posits that technology use is driven by behavioral intention, which is shaped by seven core determinants whose effects are contingent upon specific boundary conditions [4]. Studies investigating technology acceptance find that the magnitudes of the core determinants' effects vary across countries and cultural orientations [5,6]. Thus, incorporating cultural contingencies when operationalizing this model strengthens its explanatory robustness and contextual validity [7,8].

Several contributions have been devoted to religious-cultural systems that embed normative prescriptions shaping consumers' decision-making [9–11]. This is because religiosity-based factors may carry strong explanatory power alongside general theoretical behavioral predictors when explaining particular behavior [12–14]. Muslim users are encouraged to scrutinize products and to refrain from consumption if there is doubt about their compliance with Shariah teachings [15]. In Islamic contexts, products extend beyond functional evaluations (performance and ease of use) to include assessment of religious permissibility (*halal*) and alignment with *Maqasid al-Shariah*, the higher objectives of Islamic law [16,17]. The Sharia principles in Islamic culture establish a distinct value system that may systematically (1) introduce new predictors to account for cultural variations (2) or influence the salience and strength of UTAUT2 determinants. Consequently, contextualizing UTAUT2, among other user behavior theories, within the Islamic cultural setting is not merely an empirical extension but a theoretical necessity [15,18]. Against this background, this study scrutinizes studies on users' adoption of Islamic-oriented technologies through the lens of UTAUT2. Accordingly, this review focuses on Islamic cultural settings in terms of Islamic-oriented technologies (i.e., technology class) adopted by users who possess characteristics (i.e., proprieties) associated with Islamic consumption and in which Islamic beliefs are reflected to some degree (i.e., state). The specific technological characteristics motivate extending UTAUT2 by introducing context-specific variables that reflect the nature of the technology [19,20].

Several empirical studies employ the UTAUT2 framework as an underpinning theory to explain why users adopt technology within Islamic cultural settings [10,16,21–27]. However, these applications yield divergent conclusions regarding the relevance of the framework's core determinants and introduce fragmented extensions that lack cumulative logic and theoretical integration. Thus, although a growing body of research has examined UTAUT2 within the Islamic technology orientation, a systematic synthesis remains necessary to reconcile inconsistent findings, critically evaluate the framework's application, identify unresolved gaps, and articulate a coherent agenda for future research [28,29].

Only two streams of systematic literature reviews have been identified on the adoption of Islamic-based technologies. The first synthesizes determinants of Islamic Fintech adoption, offering industry-specific insights [30–32]. The second examines the application of the Technology Acceptance Model (TAM) in halal-related industries, providing a theory-based synthesis [9]. To the best of our knowledge, no review has systematically assessed how the UTAUT2 model has been applied and extended in Islamic contexts.

To address this gap, the present study aims to thoroughly map and synthesize prior research employing the UTAUT2 framework within the Islamic-oriented technology context. According to the Theories–Contexts–Characteristics–Methodologies (TCCM) framework [28], this study is guided by five research questions:

RQ1: "Which theories, contexts, and methodological approaches have been applied in studies using the UTAUT2 framework within Islamic-oriented technology?"

RQ2: "How effective are the primary UTAUT2 constructs in explaining Islamic-based technology adoption?"

RQ3: "What are the most common extensions of UTAUT2 in this area?"

RQ4: "To what extent do these studies adhere to the underlying UTAUT2's boundary conditions?"

RQ5: "In light of the findings, what research agenda can be proposed to advance the Islamic-based UTAUT2 framework further"?

To achieve this, a systematic review was conducted following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) protocol to identify, screen, and include relevant studies [11,33]. By addressing the five research questions, this study makes substantial contributions to the literature on information system adoption and Islamic research. It provides consolidated evidence on the acceptance of Islamic-oriented technology by assessing prior studies using the UTAUT2 model. Furthermore, the study comprehensively maps the theoretical boundaries of UTAUT2-based research in Islamic technology settings and examines its theoretical integrations, domain applications, and methodological implementations. This study reveals key strengths and shortcomings of existing UTAUT2-based studies in this specific cultural setting. By critically assessing prior findings, this review identifies research gaps and proposes a comprehensive roadmap for future research on the adoption of Sharia-compliant technologies.

The following sections of this paper are organized as follows: Section 2 outlines the review methodology. Section 3 presents the findings. Section 4 discusses future research directions. Finally, Section 5 presents a concise conclusion.

2. Methodology

A systematic review provides a comprehensive and organized means to map current knowledge, develop theory, and identify gaps for future investigation [9,28,31]. To enhance the rigor of the review, this study adhered to the PRISMA protocol, comprising 27 items (see Supplementary Material S1—PRISMA 2020 checklist).

Scopus was the database used to identify relevant studies. With a large collection of solid, peer-reviewed academic works, Scopus indexes high-quality academic documents and is widely accepted in many fields [34,35]. Hence, given its broad multidisciplinary coverage and substantial overlap with Web of Science [36], Scopus was used as the sole database to simplify the review process.

The search was limited to articles indexed up to 30 August 2025. The search strategy used multiple keywords to capture the essence of UTAUT2 in the Islamic context. The terms were searched within titles, abstracts, and keywords. The search query used includes alternative terms such as "technology", "information system", and "intention". To maintain the Islamic cultural context, alternative keywords were used, such as "halal", "Islamic", and "Shariah-compliant" (see Figure 1).

This review includes only English-language journal articles that empirically examine UTAUT or UTAUT2 as the underpinning theory for understanding users' acceptance of sharia-compliant technology. This review also includes the original UTAUT model but uses "UTAUT2" as the overarching framework to organize and discuss the findings. Studies published in non-English languages, as well as conference papers and book chapters, were excluded. This was performed through the automated filtering feature of the Scopus database. During the screening stage, studies that do not theoretically integrate Muslim cultural settings or ground UTAUT2 (even if they employ one or more of its core constructs) were deemed unrelated to the review. An article was considered ineligible if it exhibited serious concerns regarding research quality, including inadequate analytical procedures

or substantial overlap with previously published work (Table 1). Quality assessment is performed during the full-text screening stage.

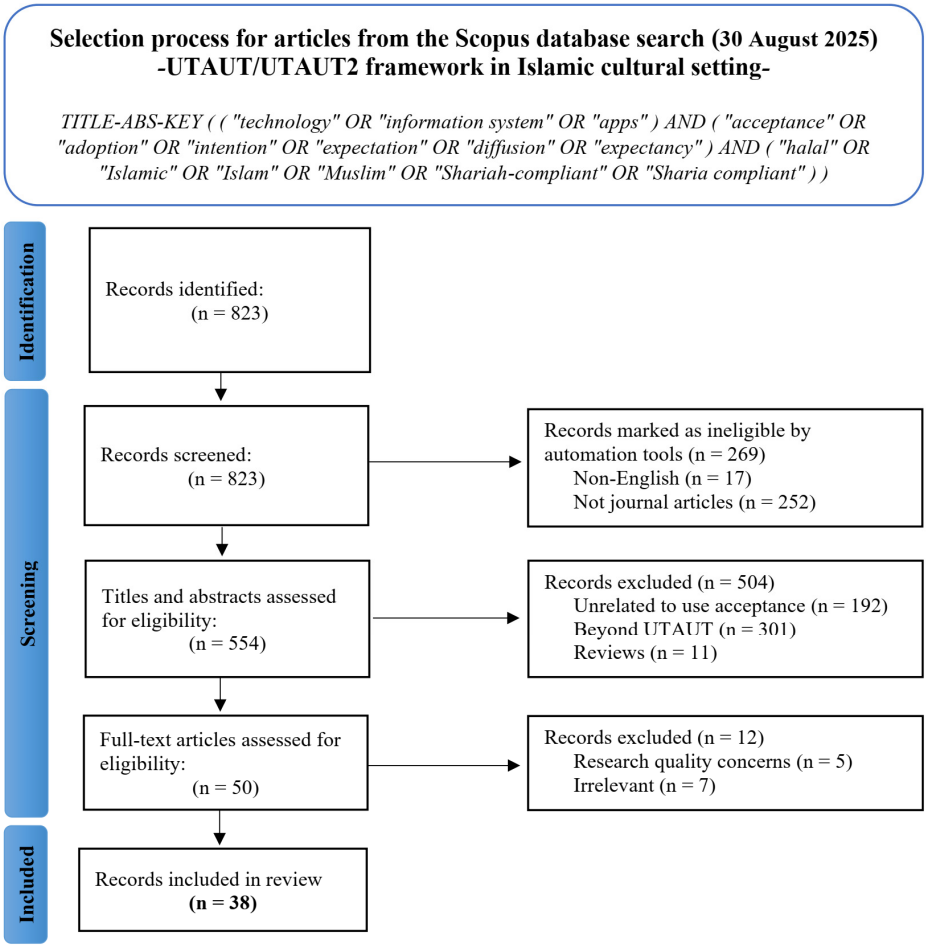


Figure 1. PRISMA flow chart.

Table 1. Exclusion and inclusion criteria.

Inclusion Criteria	Exclusion Criteria
• Empirical studies. • Explicit use of UTAUT2 core constructs. • Theoretically integrating the Islamic cultural context. • Scopus-indexed. • Journal articles. • Published in English. • Acceptable research quality.	• Conceptual or review papers. • UTAUT2 is not the analytical foundation. • outside Islamic cultural settings. • Non-indexed in the Scopus database. • Conference papers and book chapters. • Non-English publications. • Research quality concerns.

Excel was used for data management. After a pilot test of five randomly selected articles to identify potential issues in coding and extraction, Google Forms were used to collect data. Data extraction was conducted by three authors and cross-checked by two additional authors. Any discrepancies were resolved through point-by-point discussion until consensus was reached. The TCCM framework was adapted to the *study characteristics*. Theories include "extended theories". Characteristics include "significance of core determinants", "explanations of the insignificance", "additional variables as determinants, moderators, and outcomes", "intention–usage conceptualization", "R^2 value", and "boundary conditions".

Context encompasses "country setting", "domain", and "technology type". Methodology covers "research design", "sample size", and "strategy analysis ". In addition, "publication year", "journal name", and "total citations" were extracted as *document characteristics*. Where information was missing or unclear, we recorded it as "not reported".

The resulting evidence was synthesized through tables and figures. Descriptive frequencies were used for categorical characteristics and for the presence or absence of reporting elements, while the proportions of significant and insignificant findings were calculated for each predictor relative to the number of studies that examined it (%). Thematic findings were synthesized narratively by identifying recurring explanatory themes for insignificant predictors.

3. Finding

3.1. Study Selection

The review selection process is illustrated in Figure 1. A total of 823 records were initially identified from the Scopus database. Of these, 269 records were excluded, including 17 non-English publications and 252 documents that were not journal articles. The remaining 554 articles underwent title and abstract screening. At this stage, a total of 504 articles were excluded for falling outside the scope of this review. The primary reasons for exclusion were that the studies did not address technology adoption (n = 192), did not draw on any explicit theoretical framework or relied on frameworks other than UTAUT or UTAUT2 (n = 301), or were conceptual or review-based rather than empirical investigations (n = 11). Fifty articles remained eligible for full-text assessment. In this stage, 12 articles were excluded: 5 due to insufficient research quality and 7 for irrelevance to the research objectives. Eventually, 38 articles met the inclusion and exclusion criteria and were retained for the review (see Supplementary Material S2 for the included studies and the extracted data).

3.2. Document Characteristics

3.2.1. Publication over Time

As illustrated in Figure 2, scholarly interest in UTAUT2 applications within Islamic technology contexts has increased over time. The first contribution was identified in 2018 [37]. Research output remained limited in 2019 and 2020, then gradually rose in 2021 and 2022. A significant surge occurred in 2023, which marked the peak of publication activity (n = 14), while continued growth was observed in 2024 (n = 11). Early evidence up to August 2025 shows three publications.

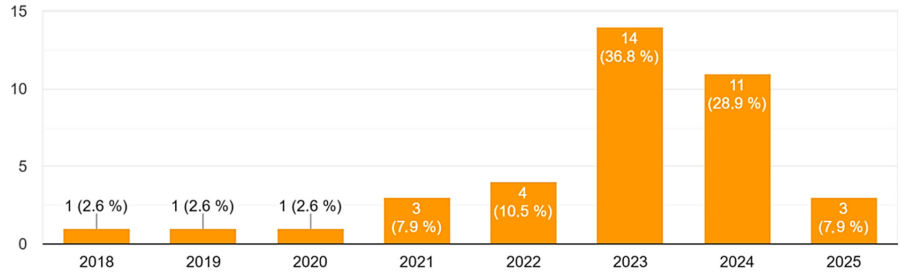


Figure 2. Publications over time.

3.2.2. Publication Outlets

Islamic-focused journals dominated the literature, accounting for 52.6% (n = 20) of the included studies, reflecting their central role in advancing UTAUT-based research on user acceptance within Islamic contexts. The *Journal of Islamic Marketing* (Emerald, Q1) is the most productive, accounting for 29% of the articles (n = 11). The *Journal of Islamic*

Monetary Economics and Finance (Bank Indonesia Institute, Q2) is the second, with 10.5% (n = 4). Other journals with two contributions include the *Global Business and Finance Review* (People and Global Business Association, Q3), *Journal of Islamic Accounting and Business Research* (Emerald, Q1), and the *ISRA International Journal of Islamic Finance* (Emerald, Q2). Meanwhile, fewer studies were published in other journals, each with one article (Table 2).

Table 2. Publication outlets.

Journal Name	n	Best Quartile (Q1) Journal	
Journal of Islamic Marketing	11	Q1	Marketing
Journal of Islamic Monetary Economic	4	Q2	General Economic, Econometrics and Finance
Global Business and Finance Review	2	Q3	Finance
ISRA International Journal of Islamic Finance	2	Q2	Economics, Econometrics and Finance (miscellaneous)
Journal of Islamic Accounting and Business Research	2	Q1	Accounting
African Journal of Science, Technology, Innovation and Development	1	Q2	Development
Banks and Bank Systems	1	Q1	Law
Cleaner Logistic and Supply Chain	1	Q1	Environmental Science (miscellaneous)
Decision Science Letters	1	Q3	General Decision Sciences
Indonesian Journal of Halal Research	1	Q2	Religious Studies
Innovative Marketing	1	Q1	Law
International Journal of Law and Management	1	Q1	Law
Journal of Environmental Planning and Management	1	Q1	Geography, Planning and Dwvelopment
Journal of Infrastructure Policy and Development	1	Q3	Social Science, Public Administration, and Development
Journal of King Abdulaziz University Islamic Economics	1	Q4	General Economics, Econometrics, and Finance
Journal of Law and Sustainable Development	1	Q2	Law, Development, Environmental Science, Policy, and Law
Journal of Open Innovation Technology Market and Complexity	1	Q1	Sociology and Political Science
Journal of Theoretical and Applied Information Technology	1	Q4	General Computer Science
International Journal of Business Excellence	1	Q3	Strategy and Management
Quality Access to Success	1	Q4	Management Information System
Risks	1	Q1	Economics, Econometrics and Finance (miscellaneous)
Romanian Journal of Information Technology and Automatic Control	1	Q3	General Computer Science

3.2.3. Total Citations

The study by [22] is the most influential work in this field, garnering 414 total citations on Google Scholar, followed by [38] with 201 citations. The remaining eight studies have accumulated between 38 and 84 citations each, with an average of more than 20 citations per year. Five of the most cited articles are published in the *Journal of Islamic Marketing* (Table 3).

Table 3. Top ten cited articles.

Authors	Journals	Total Citation (Google Scholar)
Raza et al. (2019)	Journal of Islamic Marketing	414
Kasri & Yuniar (2021)	Journal of Islamic Accounting and Business Research	201
Thanker et al. (2022)	Journal of Islamic Marketing	84
Thanker et al., (2021)	Journal of Islamic Marketing	83
Ahmed & Yahaya (2023)	Journal of Islamic Marketing	59
Kasri & Sosianti (2023)	Journal of Islamic Monetary Economics and Finance	56
Harahap et al. (2023)	Journal of Islamic Monetary Economics and Finance	55
Bin-Nashawan, Ismaiel et al. (2023)	Journal of Islamic Marketing	41
Bakri, Almansoori, et al. (2023)	Global Business and Finance Review	40
Bin-Nashawan, Husssain Shah, et al. (2023)	Journal of Islamic Accounting and Business Research	38

3.3. Theories

The overwhelming majority of UTAUT-based studies in Islamic-oriented technology did not incorporate complementary theories (81.6%; n = 31). Seven studies integrated three theories:

Information Systems Success Model (ISSM) is frequently integrated into a focused framework (10.5%; n = 4). According to ISSM, the user's acceptance of any system depends not only on system quality, but also on information quality and service quality [39]. The included studies demonstrate that system quality, service quality, and information quality of the technology are associated positively with technology performance, user satisfaction, and behavioral intention [40–42], but not with actual usage [43].

Social Cognitive Theory (SCT) is employed in two studies. SCT emphasizes that individuals acquire knowledge through observing their social environment, interactions, and external influences. This theory is employed to support the positive influence of self-efficacy and social isolation in the ZakaTech adoption context [27,44].

Theory of Planned Behavior (TPB) is used in one study and indicates that attitude and subjective norms positively influence behavioral intention to use halal food apps, while perceived behavioral control does not [45].

3.4. Contexts

3.4.1. Application Context

The UTAUT2 frameworks in Islamic technology orientation were applied predominantly in the banking and financial services sector (81.6%; n = 31) (Figure 3), including m-banking [21], internet banking [26], Internet-only banks [16], zakat e-payment [46], Islamic digital wallet [24], and blockchain technology [47].

Understanding halal food applications through UTAUT2 frameworks is examined in two studies [42,45]. Two other studies examined the acceptance of technologies for *waqf* assets [48,49]. Professionals' use of technology is examined in two studies: the adoption of AI by Islamic banking employees [50] and the use of digital gold platforms for investment [51]. The B2B services are examined in one study that explores the adoption of halal certification technology through digital media [41].



Figure 3. Examined sectors.

3.4.2. Geographical Focus

The distribution of UTAUT2-based studies reveals a clear geographical concentration (Table 4). Indonesia (36.8%) and Malaysia (26.3%) dominate, together accounting for nearly two-thirds of the research [23,38]. Pakistan contributes 10.5% (n = 4), while Bangladesh, Saudi Arabia, Morocco, Jordan, Kuwait, and Palestine each account for 2.6% (n = 1). Two studies take a cross-country perspective, one comparing Saudi Arabia and Egypt [44], and another comparing Indonesia and Malaysia [52].

Table 4. Country-level contributions.

Country	n	Percent.
Indonesia	14	36.8%
Malasia	10	26.3%
Pakistan	4	10.5%
Bangladesh	1	2.6%
Saudi Arabia	1	2.6%
Morocco	1	2.6%
Jordan	1	2.6%
Kuwait	1	2.6%
Palestine	1	2.6%
Saudi Arabia	1	2.6%
Saudi Arabia and Egypt	1	2.6%
Indonesia and Malaysia	1	2.6%
Not specified	1	2.6%

3.5. Methodologies

3.5.1. Research Design

The cross-sectional design is employed in the vast majority of included studies (94.7%; n = 36) [,[53]]. Only two studies have adopted a mixed-method approach (5.3%). Riza and Wijayanti (2024) [54] employed an *open-ended question* as a qualitative method to explore users' experiences and behaviors and to analyze the constraints encountered in adopting Islamic digital banking. Juniati and Widiastuti (2024) [47] conducted interviews with IT experts to assess the readiness of the community, policymakers, and academics to embrace blockchain-based financial technology.

3.5.2. Sample Size

The studies on the UTAUT2 framework in Islamic-based technology included in this review involved 13,450 respondents. As illustrated in Figure 4, about 19% (n = 7) used

fewer than 200 participants [45], while the majority employed samples ranging from 300 to 500 (n = 24) [55]. Studies with more than 500 participants accounted for 19% (n = 7) [56].

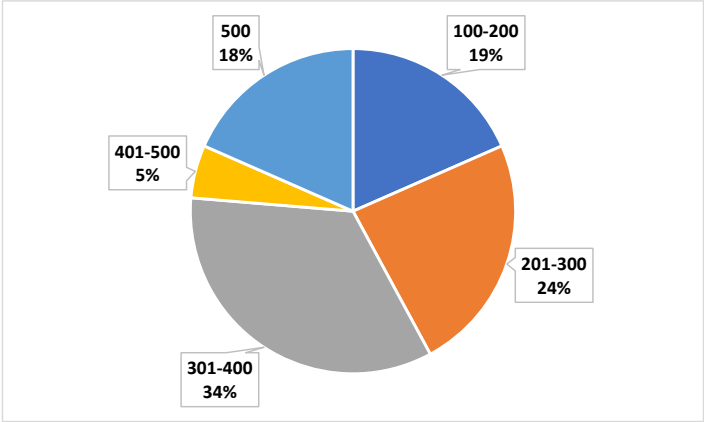


Figure 4. Sample size.

3.5.3. Data Analysis Strategy

The causal logic of linear regression dominates in UTAUT2-based studies conducted within Islamic technology settings (Figure 5). Specifically, 78.9% of studies (n = 30) applied Partial Least Squares Structural Equation Modeling (PLS-SEM), while only 5 studies adopted Covariance-Based Structural Equation Modeling (CB-SEM) and 3 studies utilized multiple linear regression. Two complementary analytical approaches to PLS-SEM were employed in three studies each, including Importance-Performance Map Analysis (IPMA) and Multigroup Analysis (MGA). The IPMA identifies variables that are highly important but perform poorly, thereby highlighting areas requiring improvement. For instance, Thaker et al. (2021) [57] found that Islamic banks should strengthen PE in social media marketing, as it is highly important but performs only moderately. In contrast, interactivity and HM performed strongly but were not considered significant by Islamic banking consumers. The MGA tests whether the effect of an independent variable on a dependent variable differs significantly across two or more predefined groups. For instance, a study demonstrates that in Egypt, females are more strongly influenced by SI when adopting zakat technology services compared to males, whereas in Saudi Arabia, no gender differences were observed [44].

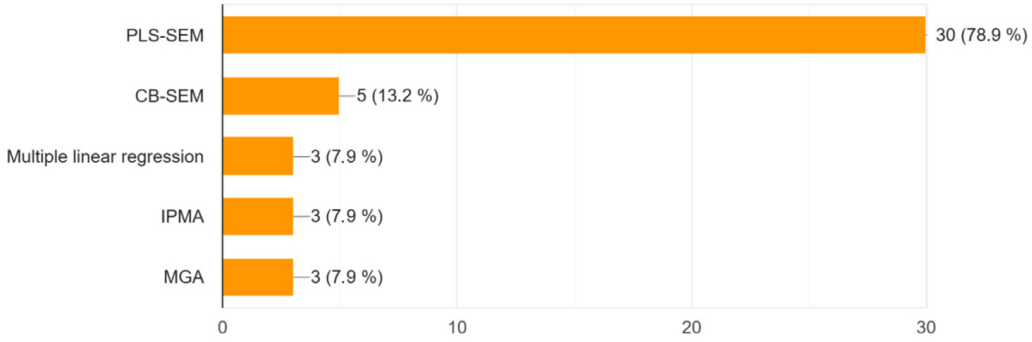


Figure 5. Data analysis strategies.

3.6. Characteristics

3.6.1. UTAUT2 Primary Constructs

The baseline UTAUT model predominates in examining technology acceptance within Islamic-oriented technology, whereas UTAUT2 appears in only 34.2% of studies (n = 13). It is worth noting that both models share the four core constructs: performance expectancy, effort

expectancy, social influence, and facilitating conditions. These constructs explain technology acceptance by capturing its expected benefits, perceived ease of use, influence of important others, and availability of resources and support, respectively [58,59]. Accordingly, findings related to these constructs are discussed collectively across studies that apply either UTAUT or UTAUT2, enabling a more integrated comparison of the existing evidence. Beyond these shared constructs, UTAUT2 extends the original model by incorporating hedonic motivation, price value, and habit [4,60].

The review shows that performance expectancy and habit were consistently significant across studies, with only 13.9% and 11.1% of the studies reporting non-significant associations, respectively (Figure 6). However, hedonic motivation (63.6%), price value (54.5%), and social influence (41.2%) were frequently reported as insignificant predictors. In addition, approximately one-third of the studies found no significant effects of effort expectancy (36.1%) and facilitating conditions (30%) on behavioral intention.

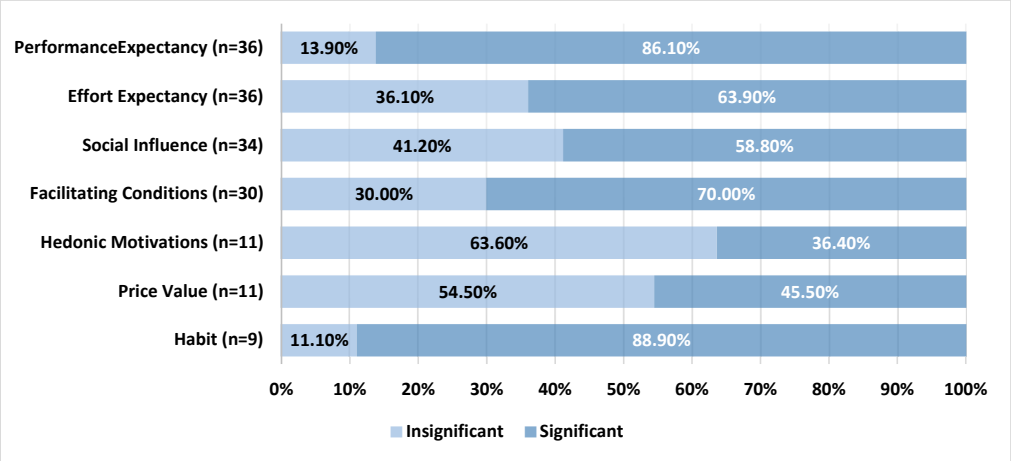


Figure 6. The performance of primary constructs.

One of the core features of the UTAUT2 framework is the positive relationship between behavioral intention and actual usage. This path is conceptualized in only 36.8% of studies (n = 14).

3.6.2. Across and Specific-Context Constructs

Six studies (15.8%) did not extend UTAUT2 by adding additional variables. Two distinct categories of variables have been incorporated to enhance the model's explanatory power: across-context variables and specific-context variables. Across-context variables are constructs incorporated to enhance a model's explanatory power when applied across diverse cultural or situational settings. Trust is the most frequently added variable among the included studies (36.8%, n = 14). The literacy factor appears in six studies (15.8%). Privacy and security have also been integrated into three studies, whereas satisfaction and attitudes have been integrated into two studies (Figure 7). Context-specific variables are tailored to work only in a particular setting. Eight variables were directly related to Islamic cultural characteristics, including zakat literacy [38], religiosity [61], Islamic compliance [26], Islamic consumption ethics [24], halal awareness [45], Islamic lifestyle [62], perceived *iḥsān* [49], and spiritual motivation [62]. Religiosity and Islamic compliance were each investigated in four studies (10.5%).

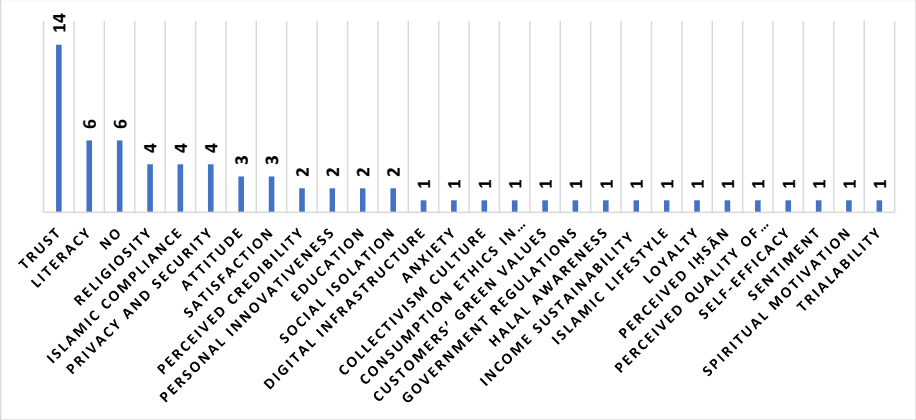


Figure 7. Additional construct.

3.7. Boundary Conditions of the UTAUT2 Framework

The relationship between the model's core determinants and behavioral intention and actual use is not always direct, as originally proposed by the theory, and may vary with factors such as adoption stage, age, and social role. The contingent factors that determine when the effect of the core construct becomes evident were neither employed nor discussed in 35 studies. Only three studies incorporated boundary conditions to a limited extent. Bin-Nashwan et al. (2023) [44] found that gender significantly moderated the effects of social influence and isolation orientation on ZakaTech adoption. Riza and Wijayanti (2024) [54] reported that only habit had a stronger effect on men's use of Islamic digital banking. Similarly, Chetioui et al. (2023) [43] showed that social influence, habit, hedonic motivation, trust, and attitude more strongly predicted mobile banking use among women, while effort expectancy and hedonic motivation were stronger among undergraduates. Generational differences also emerged: millennials showed stronger effects on facilitating conditions, hedonic motivation, price value, and attitude, whereas Generation X exhibited stronger effects on effort expectancy, social influence, trust, and perceived security.

4. Discussion and Future Research Directions

This study integrates and synthesizes the current body of knowledge on user adoption by reviewing the application of the UTAUT2 framework in the Islamic technology context (Figure 8). Furthermore, it assesses the extent to which boundary conditions have been addressed. By identifying the strengths and limitations of prior UTAUT2-based research in this context, the study provides direction for more rigorous application and theoretical advancement of the framework.

4.1. Emerging Research on Islamic-Oriented Technology Acceptance

The trend culminates in UTAUT2-based research in the cultural context of Muslims, shifting from sporadic in the early years to an emerging, increasingly consolidated stream of inquiry after 2022. Research has primarily concentrated in specialized Islamic-oriented outlets, with a gradual diffusion into broader academic domains. The UTAUT was first developed in 2003 [59] and extended in 2012 [4], but was adopted only recently in the Islamic context [37]. This may be because its initial focus on general technology settings largely overlooked niche cultural markets. Furthermore, technology acceptance models have only recently been prompted by the upsurge of technologies relevant to Muslim users, such as Islamic m-banking and halal e-services. The lack of familiarity with this framework within an Islamic background highlights an urgent need to contextualize other social, cognitive, and technology acceptance theories. The contextualization of theories sustains

theoretical advancement and provides a more nuanced understanding of technology users' beliefs, preferences, and decisions [8].

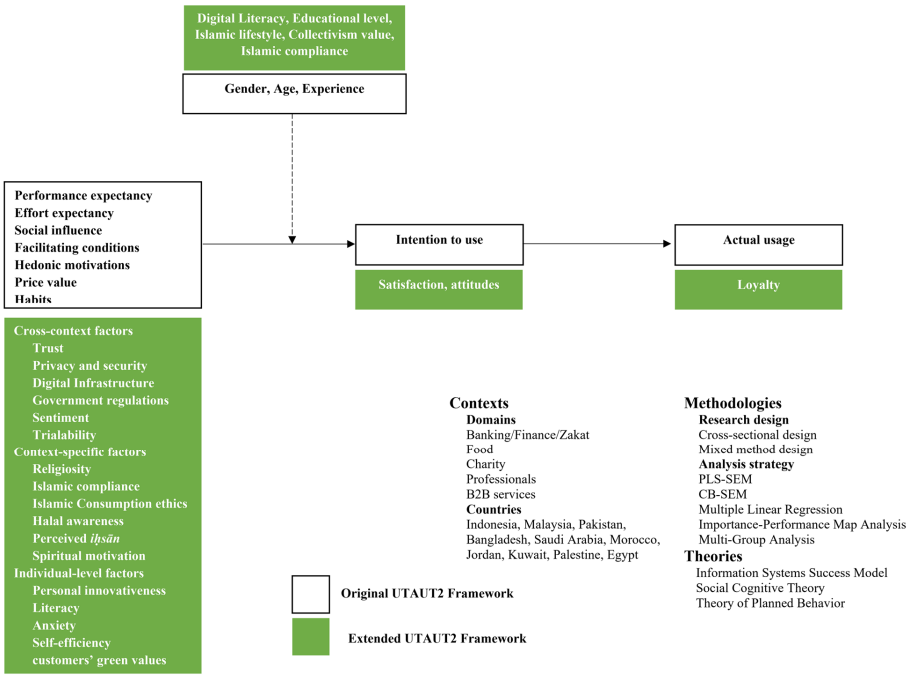


Figure 8. Integrated nomological network of Islamic UTAUT2.

4.2. Integrate Complementary Perspectives

Complementarity theories are not integrated into more than 80% of UTAUT-based studies in the Islamic context. The ISSM, SCT, and TPB are integrated only to a limited extent, while other theories remain underdeveloped. Integrating theories within a single framework while preserving parsimony will enhance the explanation of complex phenomena and yield more robust implications [1,63]. Accordingly, TAM, Task-Technology Fit (TTF), Expectation-Confirmation Theory (ECT), and Diffusion of Innovations (DOI) are important theories in technology acceptance, but remain largely unexplored in the Islamic context.

The literature privileges technology adoption frameworks, leaving the antecedents and processes of technology rejection thin. Innovation Resistance Theory provides a nuanced explanation of both functional and psychological barriers that impede users' technology adoption [64]. Moreover, developing a context-specific Islamic adoption theory is recommended to better explain technology acceptance among Muslim users. Although universal factors such as performance and trust are relevant, other contextual aspects, such as religiosity and Sharia compliance, exhibit a critical role in determining attitudes, preferences, and behavioral responses [26,30].

4.3. Explore Untapped Settings

The banking and Zakat industries dominate UTAUT2-based studies in the Islamic technology context. However, its application is comparatively weaker across several halal-related domains, including e-tourism, e-commerce, e-learning, wellness apps, lifestyle digital platforms, and healthcare technology. Employing UTAUT2 in new (halal) domains provides valuable theoretical insights to advance the UTAUT2 model to a more sophisticated level [1,8]. While UTAUT2 treats technologies as a single class, the model may not be universally applicable across all technology types. Different technologies require varying levels of interaction and cognitive effort. The rise of advanced technologies such as robots, AI-powered chatbots, and the metaverse challenges classical models of technology adoption.

More tailored models to fit specific technology classes would enhance their ability to produce actionable, practical conclusions [19,65].

The notable concentration of studies on Muslim technology acceptance in Asian countries warrants extending research to other Muslim-majority nations, such as Iran, Turkey, Algeria, and Tunisia, to determine whether the determinants of the UTAUT2 model remain predictive across diverse subcultural contexts. Muslim minorities (Muslims living in non-majority Muslim countries such as India, Canada, and the UK) are practically unexplored in technology adoption research. Examining them may enhance the model's generalizability across cultures, countries, and technology usage contexts in future research [2,6].

4.4. Enhance Methodological Perspectives

4.4.1. Implement Alternative Method Research Designs

Cross-sectional is commonly used in technology adoption research [66]. The reliance on surveys and self-reports in technology acceptance research originates from early foundational models and has been widely maintained in subsequent studies [4,59]. Although cross-sectional designs yield reliable findings, questionnaires can be administered over time to capture the dynamics of technology beliefs, trust, and usage responses through longitudinal designs [67]. Future studies can also combine a questionnaire with quasi-experimental settings to provide greater control. The use of technological devices to interpret and predict technology acceptance, such as neuroscience techniques including eye-tracking and functional magnetic resonance imaging, remains absent in Islamic behavioral research, particularly in technology adoption studies. These approaches offer an alternative design to mitigate social desirability bias inherent in self-reported data [34,68].

Despite their ability to reveal underlying assumptions, hidden relationships, and the phenomenon's nuanced characteristics, qualitative methods are absent from the reviewed studies on technology acceptance. Future research should adopt qualitative approaches (e.g., in-depth interviews, focus groups) and implicit or experimental measures (e.g., the Implicit Association Test) to generate deeper insights and complement dominant standardized methodologies.

4.4.2. Ensure the Minimum Sample Size Required

Sample size may affect the strength of UTAUT2 associations [6]. While some studies use fewer than 150 participants, larger, representative samples are necessary. Small or unrepresentative samples constrain robustness and generalizability.

4.4.3. Use Complementary Statistical Approaches

The debate over the favorability of PLS-SEM and CB-SEM continues. The PLS-SEM approach is increasingly used in UTAUT-based studies in the context of Islamic technology. It is preferred for its flexibility in sample-size requirements and distributional assumptions, as well as its user-friendly software implementation. The CB-SEM approach is powerful because it operates on well-defined assumptions, yielding more rigorous results. Additional statistical techniques move beyond the "contribution" logic (does X contribute to Y?) toward necessity logic. Necessary Condition Analysis (NCA) is an excellent method to examine "whether X is mandatory for Y to occur" [63]. This method is particularly important because some theoretically assumed predictors may not contribute (enhance) significantly to behavioral intention or technology use, yet their necessity (indispensability) for these outcomes remains clear. In addition, uncovering group differences through MGA and assessing the relative importance of determinants through IPMA would enhance the robustness of Islamic-based technology acceptance models.

4.5. Elaborate on the UTAUT2 Framework

Several studies that integrated the UTAUT2 framework in Islamic contexts omitted key constructs without justification. For instance, facilitating conditions were omitted in 21% of studies (n = 8), and social influence in 10.5% of studies (n = 4). Such omissions may align with the context and the study's objectives; however, they must be explicitly justified to ensure theoretical consistency, rigor, and transparency.

4.5.1. Strengthen the Theoretical Basis of the Associations

To establish strong theoretical reasoning, UTAUT2 posits that relationships among core constructs are not inherently direct; rather, their prominence (or significance) varies with boundary conditions, such as settings, individual characteristics, experience level, and the importance of other associations [3,4,59]. However, studies conducted in Islamic-based technology often theorize the associations as direct effects, overlooking the moderating mechanisms embedded in the baseline framework or in other sound theoretical contributions. Consequently, when insignificant results emerge, they are rarely interpreted through the lens of UTAUT2 boundary conditions, and most studies provide limited theoretical clarification to advance cumulative knowledge. This section discusses the relevance of UTAUT2 associations, groups non-significant findings by theme, and offers alternative theory-based recommendations to refine the Islamic UTAUT2-based studies.

Performance Expectance

The collective findings demonstrate that the efficiency of new technology to assist Muslim users compared to the traditional method makes users more prone to adopt this technology [10,69]. In contrast, some studies found that performance expectancy does not explain intention to use, except one study, which argued that performance expectancy influences intentions through users' overall attitudes [16], aligning with the theoretical improvement positing that attitudes are an integral part of technology acceptance models to understand users' intention to use technology [19,66].

Effort Expectancy

The significant effect of effort expectancy is confirmed in only 64% of UTAUT-based studies. Although ease of use and convenience are necessary conditions for the success of new technologies, they do not serve as direct predictors of intention [47,55,69]. The insignificant role of effort expectancy is likely due to familiarity, setting, and age. Users' lack of familiarity with the technology renders the effect less pronounced than among experienced users [59]. For Muslims, zakat is an obligatory practice that motivates donation despite technological challenges [27,44], whereas in non-mandatory settings, users may prefer the easiest system to complete their tasks. Two included studies provided theoretical explanations for the lack of significance of effort expectancy in relation to the intention to use technology. They attributed this finding to the young [21] and highly educated [25] Muslim populations under investigation.

Facilitating Conditions

Within UTAUT2, facilitating conditions are expected to affect both intention and use behavior positively, given that they reflect structural and resource-based barriers to adoption [4]. Nevertheless, all Islamic UTAUT2-based studies ignored this theoretical proposition and limited the facilitating conditions to predicting intention only. They indicate that when facilitating conditions are absent, the diffusion of new technology is hindered [40]; however, this finding was not supported in nine studies, and none of them provided a theoretical explanation [26,62]. Several mechanisms can account for the strength and direction

of this relationship, all of which were overlooked by the included studies. Older users and women often experience greater difficulty and anxiety when engaging with technology compared to the younger generation and men, who are generally more confident in handling technological challenges [70]. Moreover, users' innovativeness with advanced IT skills may offset the absence of technological resources. The original framework posits that when the effort expectancy is salient, it compensates for the role of facilitating conditions [4]. This is because infrastructure, support, and resources represent contextual factors that shape an individual's perception of how easy or difficult it is to perform a task using technology [4].

Social Influence

Several studies show that social influence does not significantly explain technology acceptance, contradicting its established theoretical role. The reviewed studies attributed this insignificance to the "confidentiality" of the technology solution and the "autonomy" of users. The use of banking and finance technologies requires personal and sensitive information, thereby privacy concerns abate the relevance of social endorsement in adoption decisions [23,51,53,69,71]. In ZakaTech contexts, users prefer independent decision-making (self-determination) and are thus less influenced by the social environment [26,61]. The absence of a direct effect of social influence on behavioral intention [37,72,73] signals the need to reassess its role in technology adoption models theoretically. The baseline frameworks of UTAUT and UTAUT2 did not conceptualize the path from social influence to behavioral intention as the main direct path. However, it is effective among women, older adults, and less-experienced users [4,59]. For instance, users in the pre-adoption stage depend on others' opinions, whereas experienced users in the post-adoption stage rely primarily on personal knowledge.

The Islamic community warrants contextualization when examining social influence, given its strong interaction, mutual support, and *nassiha*. While social influence may shape the adoption of Sharia-compliant technologies, evidence shows it does not consistently predict behavior [37,71]. Thus, Islamic motivations should be treated as boundary conditions. Social support may strengthen its effect, yet in personal matters, influence may weaken, consistent with prophetic guidance, "Part of the excellence of a person's Islam is leaving what does not concern him" (At-Tirmidhi, 2317).

Hedonic Motivations

The general assumption is that users adopt new technology not only for the utility it generates but also for the enjoyment experienced during its use [4]. Within studies conducted in Islamic-oriented technology, hedonic motivation does not consistently emerge as a significant predictor of technology use, as (63.6%) concluded that this relationship was not significant [45,61], and only four studies reported a positive effect [22,43,53,73]. The insignificant effect was attributed to the predominance of older participants (aged 40 and above) [61], consistent with UTAUT2 theorization that hedonic value is less influential for older users, who tend to place less value on enjoyment in technology use [23,57] argued that Islamic banking products are productivity-oriented and emphasize privacy and confidentiality concerns, overshadowing the pleasure aspects in adoption decisions.

The Islamic perspective regarding the conceptualization of hedonic motivation is not incorporated. In the literature on Islamic consumer behavior, it is assumed that choice is influenced by a product's functional utility while adhering to Sharia principles. In contrast, hedonism is viewed as lying outside the ultimate purpose of human beings. This is often associated with irrationality, excess, extravagance, and conflict with principles of sustainability [74,75]. The Holy Qur'an praised Prophet Jesus (peace be upon him):

"*And He has made me blessed wherever I am*" (19/31). The exegete explained that "*blessed*" means *"useful"*.

Price Value

Users' perceptions of the benefits gained from using a technology relative to its monetary costs determine the likelihood of adoption [22,43]. However, more than half of the Islamic UTAUT2-based studies concluded that price value plays no significant role in predicting adoption intention [16,26,54]. The boundary conditions of the UTAUT2 framework are rarely used to explain this relationship. Only two studies have explicitly addressed the irrelevance of price value in using technology in an Islamic cultural setting: [61] argue that ZakaTech is not intended for commercial purposes, while [45] suggest that customers are more likely to pay more for halal food through apps. Thus, further scholarly work should examine whether worship and religious-purpose technology use act as context-specific mechanisms that reduce the relevance of price value, in line with Islamic teachings such as the Qur'anic verse: "And whatever you spend of good—it will be fully repaid to you, and you will not be wronged" (Qur'an 2/272).

Habit

The included studies demonstrate that the repeated execution of a behavior can directly shape both intention and action [61,62], but when the technology implementation is in its early stages, habits do not form immediately among users; rather, they develop gradually over time [21]. Within the Islamic-oriented technology context, habit emerges as the most consistent predictor of behavioral intention to use technology, exhibiting statistically significant effects across all studies examining this relationship. This is consistent with findings from other domains applying the UTAUT2 framework, because habit reflects a stored intention that can instantly trigger behavior [4]. Habit is theoretically well grounded and carries important managerial implications for enhancing technology use. It is argued that habit can readily translate intention into behavior, particularly when facilitating conditions are available [4]. Thus, future studies should incorporate this construct as a positive moderator of the relationship between intention and actual usage. Other related constructs warrant conceptual and empirical validation, including proxy variables such as experience level, personal innovativeness, technology readiness, familiarity, and literacy. Examining these proxies may clarify how they shape technology acceptance across comparable technologies.

4.5.2. Potential Contextual Constructs

Depending on the research objectives, the theoretical frameworks appropriately incorporate contextual constructs to provide a more comprehensive understanding. Interestingly, UTAUT2-based studies in the Islamic-oriented technology exhibit a rich pattern of extensions (either antecedents, moderators, or outcomes), whereas only 15.8% (n = 6) retained the model without modification. The most frequently added *across-context constructs* were "trust" and "security and privacy", incorporated as antecedents of behavioral intention. The trust factor is almost universally used across diverse settings and is found to be the most significant predictor to reduce risks, strengthen attitude, form intention, and use continuance [26,37,46,76], because trust is a solid feature and it is permanently relevant for initial exchange and long-term relationships [39,60,67,77].

Other additional variables are directly rooted in *Islamic cultural characteristics*. This review reveals that context-specific constructs such as religiosity [55], Islamic compliance [51], zakat literacy [52], perceived *iḥsān* [49], Islamic lifestyle, and spiritual motivation [62] emerge from Islamic beliefs and values that illuminate technology adoption. Prior research acknowledges that technology features alone do not fully explain system use in many con-

texts, indicating that usage-related beliefs require broader conceptualization [78]. In the context of Islamic-oriented technologies, alignment with religious values is not a peripheral consideration but is a central determinant [31]. Therefore, the belief set should be expanded to incorporate Islamic-specific constructs. Future studies should therefore identify the important role of such context-specific variables in reaching a stronger explanatory account of user behavior through cultural dimensions inherent to technology use.

Among the *individual-level characteristics*, "*personal innovativeness*" has been examined in only two studies, yet it merits further attention as it is incorporated into the UTAUT3 framework, which has already gained significant scholarly recognition [60]. However, the theoretical foundation of personal innovativeness remains unclear. First, it is ambiguous whether it should be categorized as a behavioral construct (manifest in the post-adoption stage) or as a personality trait (captured through self-reported measures) [79]. Second, in contrast to the associations proposed in the UTAUT2 framework, personal innovativeness has not demonstrated clearly structured theoretical pathways through underlying mechanisms. Since the evidence is mixed, should personal innovativeness be better examined as a moderating variable that clarifies the boundary conditions influencing technology adoption intention, or as a direct determinant of both behavioral intention and actual technology use? Further theoretical refinement to strengthen its justification in explaining technology adoption.

4.5.3. Explore Other Outcomes

The link between intention and actual use, a central feature of the UTAUT2, was overlooked in 63.2% of UTAUT-based studies conducted in Islamic contexts. Studies across domains and cultures should retain this association, as it is theoretically grounded in well-established theories such as TPB and TAM. However, excluding this link may be justifiable for non-users (pre-adoption) to understand acceptance. In contrast, incorporating actual usage for actual users enhances understanding of the intention-behavior gap. Technology use is often measured through self-reports. Nevertheless, adding objective indicators such as log data or behavioral tracking may strengthen methodological and theoretical contributions. Beyond behavioral intention and use, information system sustainability should also consider continuance, discontinuance, abandonment, hesitation, switching, and upgrading behaviors to better explain long-term user engagement in line with the perspectives and ultimate goal of technology providers [80].

4.5.4. Consider the Boundary Conditions of the UTAUT2

The effects of the seven core constructs of UTAUT2 are not always direct; rather, they are conditional on factors. For instance, the effect of social influence is evident primarily during the early stages of adoption but gradually decreases to negligible levels in the post-adoption phase [4,59]. The reviewed studies largely overlooked the influence of events, with only three studies incorporating age, gender, experience, and education in moderation analyses. This limitation is evident not only in Islamic settings but also across other research settings. As stated by the founder of UTAUT: "*Overall, we found few studies that have tested the moderation effects in studying technology use in existing UTAUT applications*." [3]. He elaborated, stating: "*Cumulatively, this finding is both surprising and disappointing*". Accordingly, future studies using the UTAUT2 should address its boundary conditions to improve generalizability and strengthen theoretical contributions by properly contextualizing the research within the target culture.

Based on the research gaps discussed and other opportunities identified from prior contributions in technology acceptance systems, the research agenda is outlined in Table 5

to advance the understanding of users' acceptance and use of sharia-compliant technology through the UTAUT2 framework.

Table 5. Islamic UTAUT2 research agenda.

Elements	Future Research Agenda
Theories	■ Integrate complementary theories to UTAUT2 framework for robust implications.
Contexts	
Domains	■ Explore untapped domains.
Technologies	■ Explore untapped technologies.
Countries	■ Explore other Muslim-majority countries. ■ Explore Muslim-minority countries. ■ Compare the relevance of UTAUT2 among countries
Characteristics	
Original UTAUT2 framework	■ Justify the omissions of any key determinants of UTAUT2. ■ Strengthen the theoretical linkage of key determinants of UTAUT2. ■ Explore the intention-usage link.
Augmentations	■ Incorporate cross-context constructs. ■ Incorporate Islamic-specific constructs. ■ Incorporate individual-level characteristics.
Boundary conditions	■ Explore the boundary conditions of UTAUT2 framework. ■ Develop new boundary conditions related to Islamic cultural settings.
Outcomes	■ Explore new important outcomes.
Methodologies	■ Implement alternative research designs. ■ Ensure minimum sample size required. ■ Use complementary statistical approaches.

5. Conclusions and Limitations

Guided by the PRISMA protocol, this study synthesizes the Islamic technology acceptance literature that employed the UTAUT2 framework. The body of knowledge is structured using the TCCM framework and evaluated against the original UTAUT2 framework and major contributions in information systems adoption. Accordingly, this review not only consolidates existing knowledge but also identifies theoretical and methodological patterns and gaps, offering a focused and contextualized agenda for future Islamic UTAUT2-based research.

Despite growing research traction, findings indicate that only few studies have extended UTAUT2 with complementary theories, thereby constraining theoretical advancement in understanding why users adopt Islamic technology solutions. Asian countries are the most studied populations, and digital banking dominates research on UTAUT2-based studies in an Islamic context. The cross-sectional design remains the sole research design used, with PLS-SEM dominating the analytical trend. These findings directly address RQ1. Responding to RQ2, the influence of UTAUT2 determinants on behavioral intention is not consistently significant within this research area. In particular, performance expectancy and habit often predict behavioral intention, whereas effort expectancy, social influence,

hedonic motivation, facilitating conditions, and price value often show no significant effects. Trust is the most commonly integrated cross-context construct in UTAUT2 extensions, while religiosity and Islamic compliance are the most frequently used as Islamic-specific constructs. Thus, addressing RQ3. Regarding RQ4, a limited number of the reviewed studies in examined the boundary conditions specified in the baseline models. Based on the discussed findings and identified research gaps, Table 5 recaps the future research agenda aimed at extending the Islamic UTAUT2 framework by addressing theoretical integration, contextual gaps, additional construct development, and methodological advancement. Accordantly, the RQ5 was addressed.

5.1. Theoretical Contributions

This study offers important hallmarks to technology acceptance and the Islamic user behavior literature. It is among the early studies to systematically synthesize UTAUT2-based research in this setting. Furthermore, this study critically assesses the included literature by identifying its strengths and shortcomings and presents a research agenda to guide future investigations in this area. Particularly, this review offers three key theoretical contributions. First, it systematically organizes fragmented research on Islamic UTAUT2 using TCCM. It offers a clear intellectual structure of theories, contexts, characteristics, and methodologies. Importantly, this review compiles scattered findings into a nomological framework, moving the literature from isolated UTAUT2 applications toward a cumulative theoretical model tailored to Islamic contexts, illustrated in Figure 8.

Second, it assesses the extent to which Islamic-context studies respect (or violate) the original boundary conditions of the UTAUT2. The review reveals a major theoretical oversight regarding the boundary conditions of associations, such as gender, age, education, experience, and technology class (type), that shape the strength and direction of core determinants. Ignoring these mechanisms limits the model's ability to capture how technology adoption operates accurately [3,4] within Islamic contexts.

Third, this review differentiates among cross-context extensions (e.g., trust) [44,46], Islamic-specific constructs (e.g., religiosity and Sharia-compliance) [45,51], and individual-level characteristics (e.g., personal innovativeness) [26,81] as major extensions of the UTAUT2 in Islamic technology adoption; it explains in detail how the model adapts and evolves within Islamic cultural settings, particularly within the Islamic technology setting, emphasizing theoretical advancement through contextualization.

5.2. Practical Contributions

This review provides actionable insights for Islamic technology providers and policymakers. First, it identifies high-impact determinants of adoption, particularly performance expectations, habits, and trust, enabling Islamic technology providers to allocate resources and tailor strategies toward empirically validated drivers rather than intuitive assumptions. Second, the findings advocate market segmentation by adoption stage, technology type, gender, and age, encouraging differentiated engagement strategies rather than undifferentiated mass targeting. Third, by foregrounding Islamic-specific constructs such as religiosity and Sharia compliance, the review informs culturally congruent design and communication strategies that strengthen the legitimacy of technology and users' confidence in it. Fourth, given the importance of trust and perceived risk, the review underscores the strategic necessity of regulatory clarity, robust security measures, and privacy protection mechanisms to mitigate perceived risk and sustain long-term user engagement within Islamic digital ecosystems.

5.3. Limitations

Notwithstanding its contributions, this review has limitations that future reviews should address. This review relied on a single database (i.e., Scopus); other sources, such as Dimensions, Web of Science, and Google Scholar, were not explored to possibly identify other relevant publications. The review synthesizes knowledge using framework-based and thematic analyses but lacks a quantitative meta-analysis to estimate weighted effects. Bibliometric studies could explore the intellectual structure, topic development, publication trends, and key research constituents. This study included all journal rankings; future reviews may focus on Q1 and Q2 journals to improve quality. This review covered diverse technology applications in Islamic contexts. A key limitation of the current study is the overrepresentation of Islamic e-banking among the included studies. This pattern highlights the need for sector-specific reviews, such as those on Islamic e-banking, to generate practical, more nuanced insights. The importance of sector-specific reviews may be attributed to the distinctive benefits and challenges faced by the financial products and customers' specific expectations compared with other services [82], such as tourism and education.

Supplementary Materials: The following supporting information can be downloaded at https://www.mdpi.com/article/10.3390/soc16110387/s1, S1: PRISMA 2020 Checklist; S2: Included studies and data extracted from included studies.

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