



## Artificial Intelligence and the Digital Transformation of Islamic Marriage Registration in Indonesia

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### Article Info

#### Article history:

Received Jun 12<sup>th</sup>, 2025

Revised Aug 20<sup>th</sup>, 2025

Accepted Dec 25<sup>th</sup>, 2025

#### Keyword:

Artificial Intelligence; Islamic Marriage Registration; Digital Transformation; SIMKAH; Maqasid al-Shariah.

### ABSTRACT

The integration of artificial intelligence and digital platforms into Islamic marriage registration has transformed public religious services in Indonesia. Through systems such as SIMKAH and AI-assisted verification, digital governance increasingly shapes the administration of marriage registration at the Office of Religious Affairs (KUA). This study examines the impact of digital transformation on the accessibility, efficiency, and legal validity of Islamic marriage registration within Indonesian Muslim society. Using a normative socio-legal approach, the research analyzes regulatory frameworks, digital governance policies, and the implementation of AI-assisted marriage administration systems. The findings reveal that digitalization improves bureaucratic efficiency, accelerates administrative processes, and enhances data accuracy in marriage registration services. However, significant challenges remain, including digital inequality, data privacy concerns, regulatory fragmentation, and questions regarding religious legitimacy in algorithmic procedures. The study argues that sustainable digital governance of Islamic marriage registration requires an integrated framework based on maqasid al-shariah principles, institutional accountability, and contemporary data protection standards. This research contributes to digital Islamic studies by positioning artificial intelligence as an important instrument in the modernization of Islamic family law administration in Indonesia.

### ABSTRAK

Integrasi kecerdasan buatan dan platform digital dalam pencatatan perkawinan Islam telah mengubah layanan keagamaan publik di Indonesia. Melalui sistem seperti SIMKAH dan verifikasi berbantuan AI, tata kelola digital semakin memengaruhi administrasi pencatatan perkawinan di Kantor Urusan Agama (KUA). Penelitian ini mengkaji dampak transformasi digital terhadap aksesibilitas, efisiensi, dan keabsahan hukum pencatatan perkawinan Islam dalam masyarakat Muslim Indonesia. Dengan menggunakan pendekatan sosio-legal normatif, penelitian ini menganalisis kerangka regulasi, kebijakan tata kelola digital, dan implementasi sistem administrasi perkawinan berbasis AI. Hasil penelitian menunjukkan bahwa digitalisasi mampu meningkatkan efisiensi birokrasi, mempercepat proses administrasi, dan meningkatkan akurasi data dalam layanan pencatatan perkawinan. Namun, masih terdapat tantangan terkait kesenjangan digital, perlindungan data pribadi, fragmentasi regulasi, dan legitimasi keagamaan dalam prosedur algoritmik. Penelitian ini menegaskan bahwa tata kelola digital pencatatan perkawinan Islam memerlukan kerangka terintegrasi berbasis prinsip maqasid al-shariah, akuntabilitas institusional, dan standar perlindungan data modern. Penelitian ini berkontribusi pada kajian Islam digital dengan menempatkan kecerdasan buatan sebagai instrumen penting dalam modernisasi administrasi hukum keluarga Islam di Indonesia.



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## 1. INTRODUCTION

The rapid advancement of digital technologies has fundamentally transformed public administration worldwide, introducing artificial intelligence systems that promise enhanced efficiency, transparency, and citizen-centered service delivery (Piatnychuk et al., 2026). Indonesia, as the world's largest Muslim-majority nation, faces a distinctive challenge in adapting these technological innovations to its religious administrative infrastructure, particularly within the domain of Islamic marriage registration. The Office of Religious Affairs (KUA), which operates at the sub-district level across the archipelago, serves as the primary institution responsible for registering Muslim marriages, a function that carries both civil and religious significance (Rifqi, 2024).

The urgency of examining this digital transformation cannot be overstated. Marriage registration in Indonesia represents a critical intersection of state administration, religious practice, and individual rights. The absence of proper registration generates serious legal consequences, including complications in child status determination, inheritance rights, spousal protection, and overall legal certainty in civil administration (Noris & Daim, 2026). With approximately 28,000 detected cases of unregistered marriages between 2020 and 2023 resulting in an estimated 1.5 million unregistered children, the stakes of improving marriage registration systems are significant (Firman et al., 2026). Digital transformation through AI-assisted platforms presents a potential solution to these longstanding administrative challenges.

Global scholarship on AI in public administration has expanded considerably in recent years, examining how algorithmic decision-making, automated verification systems, and data-driven governance reshape institutional practices (Chandra & Feng, 2025). Studies from diverse contexts including Singapore, Estonia, and various European nations have demonstrated that digital transformation can enhance service quality while simultaneously raising concerns about privacy, accountability, and equity (Sharmin & Chowdhury, 2025). However, the specific intersection of AI governance with religious legal systems remains understudied. Existing literature on e-government transformation rarely addresses how religious institutions and faith-based legal frameworks interact with technological modernization (Kasim et al., 2025).

At the national level, Indonesia has made substantial progress in digitizing marriage administration. The Marriage Management Information System (SIMKAH), first implemented in 2007 and subsequently upgraded to a web-based platform, represents the most significant technological intervention in this domain (Rahmanda, 2025). Research on SIMKAH implementation has documented improvements in registration efficiency and data accuracy, yet studies have also identified persistent challenges including network infrastructure limitations, varying levels of digital literacy among users, and inconsistencies in system utilization across different regions (Atmaja et al., 2025). What remains insufficiently explored is how AI-enhanced features within these systems affect the religious legitimacy of marriage administration and whether current governance frameworks adequately address the ethical implications of algorithmic processes in religious contexts.

This research addresses the following questions: First, how does AI-based digital transformation affect the accessibility, efficiency, and legal certainty of Islamic marriage registration in Indonesia? Second, what challenges arise from integrating artificial intelligence into religious administrative processes, particularly regarding data protection, digital inequality, and institutional accountability? Third, how can governance frameworks be developed that align technological innovation with both Islamic legal principles and contemporary regulatory standards?

The theoretical foundation of this study draws upon two complementary frameworks. From the perspective of Islamic law, the concept of *maqasid al-shariah* (objectives of Islamic law) provides evaluative criteria for assessing whether technological innovations serve the fundamental purposes of Islamic legislation, including the protection of religion, life, intellect, lineage, and property (Muntazar & Soberi, 2026). Contemporary scholars have demonstrated that *maqasid al-shariah* can function as both an ethical framework and a policy instrument for evaluating digital governance systems (Wahab & Mahdiya, 2026). From the perspective of public administration theory, digital-era governance and

new public governance frameworks emphasize how technological transformation reshapes institutional relationships, accountability mechanisms, and service delivery models (Dubovyi & Yashchenko, 2025).

The primary objective of this study is to analyze the impact of AI-based digital transformation on Islamic marriage registration in Indonesia, examining both the opportunities for improved service delivery and the challenges that require regulatory and institutional responses. Secondary objectives include evaluating the alignment of current digital governance practices with maqasid al-shariah principles and proposing recommendations for developing integrated governance frameworks that ensure technological innovation serves both administrative efficiency and religious legitimacy.

This research contributes to scholarly discourse in several ways. Theoretically, it extends the literature on AI governance in public administration by incorporating Islamic legal philosophy as an evaluative framework, an approach that has been underutilized in mainstream governance studies. Empirically, it provides a detailed examination of how digital transformation operates within a specific religious administrative context, generating insights relevant for other Muslim-majority jurisdictions facing similar modernization challenges. From a policy perspective, the study offers practical recommendations for Indonesian regulators and religious authorities seeking to optimize digital marriage registration while maintaining alignment with both sharia principles and data protection standards.

## **2. LITERATUR REVIEW**

### **2.1 Trends in AI and Public Administration**

The academic literature on artificial intelligence in public administration has grown substantially over the past decade, reflecting the increasing deployment of AI technologies across governmental functions worldwide. Bibliometric analyses of scholarly discourse from 2013 to 2023 reveal that research has predominantly focused on policies and mechanisms of AI integration, with algorithmic decision-making emerging as a central theme (Chandra & Feng, 2025). Key topics include algorithmic trustworthiness, bias detection, and accountability structures within what scholars term "algorithmic bureaucracies." Digital transformation in governance is no longer viewed merely as technological upgrade but as a fundamental reconfiguration of how governments design, deliver, and evaluate public services (Manea et al., 2025).

Studies consistently demonstrate that AI-driven applications can enhance administrative efficiency, enable data-driven decision-making, and improve citizen-centered service delivery (Trigkas, 2025). International best practices from Barcelona's chatbots to Helsinki's predictive energy systems illustrate how AI can increase transparency, responsiveness, and citizen satisfaction when implemented effectively. However, research also emphasizes that technological advancement alone is insufficient; the success of digital transformation depends critically on institutional capacity to reorganize work structures, build digital competencies, and shift bureaucratic culture toward more adaptive practices (Kasim et al., 2025).

### **2.2 Transformation in Religious Administration**

Several interconnected factors drive the digital transformation of religious administration, including marriage registration. First, external pressures from broader government digitalization initiatives create institutional expectations for religious agencies to modernize their service delivery mechanisms (Damar et al., 2024). In Indonesia, national policies promoting electronic government services have established frameworks within which religious institutions operate, including the KUA network responsible for Islamic marriage registration.

Second, public demand for accessible and efficient services motivates institutional change. Research on marriage registration in Indonesia reveals that citizens increasingly expect government services to be available through online platforms, with reduced waiting times and simplified procedures

(Subeitan, 2024). The COVID-19 pandemic accelerated these expectations, as health protocols necessitated remote service options and highlighted the importance of digital alternatives to in-person administrative interactions (Dorni et al., 2020).

Third, data integration requirements between government agencies create technical imperatives for digital systems. The SIMKAH platform, for instance, facilitates marriage registration while supporting data integration with civil registry offices to verify identities and reduce data manipulation risks (Subeitan, 2024). This cross-agency linkage represents a significant advancement over manual systems where verification depended entirely on physical document examination.

### **2.3 Process of AI Integration in Marriage Registration Systems**

The process of integrating AI and digital technologies into marriage registration involves multiple stages and components. At the foundational level, digitalization of records and establishment of database systems replace manual document management. The SIMKAH application represents this foundational digitalization, utilizing internet facilities to ensure more accurate, fast, and secure marriage registration processes (Rahmanda, 2025). Implementation occurs through a combination of top-down policy directives from the Ministry of Religious Affairs and bottom-up innovations at individual KUA offices (Kharlie et al., 2021).

Beyond basic digitalization, more advanced integration involves automated verification processes, data analytics for identifying patterns and anomalies, and potentially AI-assisted decision support for administrative determinations. Research on AI in public governance identifies several application areas relevant to marriage registration: document verification using pattern recognition, identity validation through cross-referencing databases, and workflow automation for processing applications (Fan, 2025). The transformation extends beyond mere process efficiency to encompass fundamental changes in how religious authority and administrative legitimacy are constituted within digital environments.

However, implementation challenges persist across different institutional contexts. Studies of SIMKAH at various KUA offices document discrepancies in bride and groom data, cases of falsified divorce certificates, canceled registrations due to family conflicts, and technical issues including network disruptions (Jannah & Sukiati, 2025). To mitigate these issues, individual KUAs have implemented measures such as stricter document verification requirements and early registration promotion to avoid last-minute complications.

### **2.4 Impact of Digital Transformation on Marriage Administration**

The impact of digital transformation on marriage administration operates across multiple dimensions. Research indicates that digitalization strengthens public services, increases transparency, and meets community expectations for improved efficiency and accessibility (Erfan et al., 2024). Specific improvements include standardization of registration procedures, enhanced data accuracy through automated validation, and reduced processing times through workflow automation.

From the perspective of legal certainty, digital registration systems potentially address longstanding issues with unregistered marriages (*nikah sirri*) that create vulnerability for wives and children (Firman et al., 2026). Constitutional Court decisions have provided legal avenues for marriage validation (*isbat nikah*), but digital systems offer preventive mechanisms by making initial registration more accessible (Nurhayati et al., 2025). The integration of SIMKAH with civil registration databases enables verification that can detect potential irregularities before marriage completion.

However, research also documents unintended consequences and persistent challenges. Digital transformation may introduce new complexities in social dynamics surrounding marriage, including potential conflicts with traditional values and religious norms (Kurniawan et al., 2024). The shift to digital platforms raises concerns regarding data privacy and security, as handling of sensitive personal information becomes more vulnerable to breaches. Studies emphasize that while digitalization increases

accessibility of legal information and simplifies procedures, it requires careful regulatory adaptation to maintain alignment with fundamental principles of Islamic law.

## 2.5 Critical Evaluation of Existing Studies

Existing scholarship on digital transformation in Islamic marriage registration exhibits several limitations that this study addresses. First, much research treats digitalization as primarily a technical or administrative phenomenon, without adequately examining its implications for religious legitimacy and Islamic legal principles. Studies on SIMKAH implementation, while valuable for documenting operational challenges and benefits, rarely engage with questions of how algorithmic processes affect the religious validity of marriage registration from a fiqh (Islamic jurisprudence) perspective.

Second, comparative analysis across different governance frameworks remains underdeveloped. Research on AI in public administration predominantly draws from Western contexts, with limited attention to how Muslim-majority jurisdictions negotiate the intersection of technological innovation and religious legal systems (Tohopi et al., 2025). Indonesia presents a distinctive case given its constitutional recognition of religious authority in marriage matters alongside commitments to digital government modernization.

Third, existing studies often examine either Islamic law or digital governance in isolation, without developing integrated analytical frameworks that can evaluate technological interventions against religious normative standards. Recent scholarship on maqasid al-shariah and digital technology demonstrates the potential for such integration (Muntazar & Soberi, 2026), but application to marriage registration specifically remains limited.

This study contributes to addressing these gaps by developing an integrated analytical framework that combines Islamic legal philosophy with contemporary digital governance theory. The research direction emphasizes three innovations: First, applying maqasid al-shariah as evaluative criteria for assessing AI integration in religious administration, moving beyond purely administrative efficiency metrics. Second, examining how digital transformation affects the relational dynamics between formal legal authority and traditional religious legitimacy in marriage registration processes (Nadhifah et al., 2026). Third, proposing governance recommendations that address both technical requirements for effective AI implementation and normative requirements for maintaining religious authenticity.

The novelty of this research lies in its interdisciplinary integration of AI governance, Islamic legal theory, and public administration analysis within a single analytical framework. By examining how technological innovation interacts with religious institutional practices, the study contributes to both governance scholarship and contemporary discussions on the adaptation of Islamic law to digital-era challenges.

## 3. METHODS

### 3.1 Research Design

This study employs a normative socio-legal research design that combines doctrinal legal analysis with examination of regulatory frameworks and institutional practices. The normative approach enables systematic evaluation of how existing regulations and policies address the integration of artificial intelligence in Islamic marriage registration, while the socio-legal dimension situates these normative frameworks within their operational context (Ilhamuna, 2025). This design is appropriate because it allows comprehensive assessment of both the formal legal architecture governing digital transformation and the practical challenges encountered during implementation.

The research adopts a qualitative methodology consistent with established approaches in Islamic legal studies and public administration research (Siddique & Rauf, 2025). Qualitative analysis enables nuanced examination of how technological systems interact with religious norms and

institutional practices, capturing complexities that quantitative approaches might overlook. The study also incorporates comparative elements, drawing on international experiences with AI governance to contextualize Indonesian developments within broader global trends.

### 3.2 Unit of Analysis

The primary unit of analysis is the governance framework for AI-assisted Islamic marriage registration in Indonesia, encompassing regulatory instruments, institutional arrangements, and technological systems. This includes examination of the SIMKAH platform and related digital infrastructure, the legal framework governing marriage registration (including Law No. 1/1974 on Marriage and the Compilation of Islamic Law), and the institutional relationships between the Ministry of Religious Affairs, individual KUA offices, and civil registration agencies.

Secondary units of analysis include the ethical frameworks applicable to AI deployment in religious administrative contexts, specifically the principles of maqasid al-shariah as interpreted by contemporary Islamic legal scholars, and international standards for AI governance including data protection regulations and algorithmic accountability frameworks.

### 3.3 Data Sources

Data Category	Primary Sources	Secondary Sources
Legal and Regulatory	Law No. 1/1974 on Marriage; Law No. 27/2022 on Personal Data Protection; KMA RI No. 829/2019; DJ.II/369/2013 Instruction	Scholarly commentaries on marriage law; Comparative regulations from other Muslim-majority jurisdictions
Policy Documents	Ministry of Religious Affairs circulars; SIMKAH technical guidelines; National AI Strategy documents	Policy analyses from academic literature; International policy frameworks (EU AI Act, OECD principles)
Islamic Legal Sources	DSN-MUI fatwas on digital transactions; Compilation of Islamic Law (KHI)	Classical fiqh texts on marriage; Contemporary ijthad on technology issues (Zakaria et al., 2025)
Academic Literature	Peer-reviewed journal articles (2022-2025) indexed in Scopus and SINTA	Research reports from institutions; Conference proceedings
Institutional Documentation	SIMKAH implementation reports; KUA operational guidelines	Digital governance assessments; NGO reports on marriage registration

Primary data collection focused on authoritative legal sources that directly govern Islamic marriage registration and digital transformation in Indonesia. These include statutory materials, implementing regulations, and relevant fatwas issued by recognized Islamic jurisprudential bodies. Secondary sources encompassed academic literature providing theoretical frameworks, empirical findings from implementation studies, and comparative analyses from other jurisdictions (Sulistyantoro et al., 2024).

### 3.4 Data Collection Techniques

Data collection employed literature study techniques consistent with doctrinal legal research methodology. Systematic identification and retrieval of relevant sources followed structured search protocols targeting databases including Scopus, Web of Science, SINTA, and legal document repositories. Search terms combined key concepts including "digital transformation," "Islamic marriage

registration," "SIMKAH," "artificial intelligence governance," "maqasid al-shariah," and related Indonesian language equivalents.

Document analysis applied hermeneutic interpretation principles appropriate for legal and religious texts, examining both literal content and underlying normative purposes. Regulatory documents were analyzed to identify provisions relevant to digital service delivery, data protection, and institutional accountability. Islamic legal sources were interpreted with attention to methodological principles including *maslahah* (public interest), consideration of *'urf* (customary practice), and alignment with *maqasid al-shariah* objectives (Maimun, 2024).

### 3.5 Data Analysis Techniques

Data analysis proceeded through multiple stages consistent with qualitative legal research methodology. Initial analysis involved thematic coding of collected materials to identify recurring concepts, regulatory gaps, and implementation challenges. Codes were organized into broader categories corresponding to the research questions: accessibility and efficiency impacts, challenges and risks, and governance framework requirements.

Normative analysis evaluated identified practices and regulations against two sets of evaluative criteria. First, assessment against *maqasid al-shariah* principles examined whether digital transformation serves the fundamental objectives of Islamic law, particularly protection of lineage (*hifz al-nasl*) through proper marriage validation and protection of dignity (*hifz al-'ird*) through privacy safeguards (Muntazar & Soberi, 2026). Second, assessment against contemporary governance standards examined alignment with principles of transparency, accountability, and data protection articulated in international frameworks and Indonesian positive law.

Comparative analysis contextualized Indonesian developments within international experience, identifying both common patterns in AI governance challenges and distinctive features arising from the religious dimensions of marriage administration. Synthesis of findings generated integrated conclusions and recommendations addressing both Islamic legal requirements and public administration needs.

## 4. RESULTS

### 4.1 Digital Infrastructure and Administrative Transformation

The digital transformation of Islamic marriage registration in Indonesia has achieved substantial implementation through the Marriage Management Information System (SIMKAH), now operating as a web-based platform across KUA offices nationwide. The system has fundamentally changed how marriage registration occurs, shifting from entirely paper-based processes to integrated digital workflows that enable online registration, document upload, and cross-agency data verification (Rahmanda, 2025). This transformation represents a significant modernization of religious administrative services, bringing Islamic marriage registration into alignment with broader e-government initiatives.

The findings indicate that SIMKAH has successfully standardized and digitized marriage registration procedures across diverse institutional contexts. At KUA Medan Barat, for example, implementation has produced measurable improvements in processing efficiency and data consistency, despite challenges requiring ongoing attention (Jannah & Sukiati, 2025). The system facilitates critical administrative functions including verification of applicant identities through integration with civil registration databases, detection of potential document irregularities, and generation of standardized marriage certificates. This digital infrastructure creates conditions for potential AI enhancement, including automated pattern recognition for document verification and anomaly detection for identifying possible fraudulent applications.

The transformation extends beyond mere digitization of existing processes to encompass changes in institutional relationships and service delivery models. Research documents how digital

systems alter the traditional roles of marriage registrars (penghulu) and village religious officials (modin), creating new configurations of authority and responsibility within marriage administration (Nadhifah et al., 2026). While formal legal authority remains centralized in the penghulu, digital systems introduce new intermediaries in the form of technological infrastructure and data verification protocols. This reconfiguration has implications for how religious legitimacy is constituted and maintained within increasingly algorithmic administrative environments.

#### **4.2 Critical Factors Affecting AI Integration in Islamic Marriage Administration**

Analysis reveals multiple interconnected factors that shape the effectiveness and sustainability of AI-based digital transformation in Islamic marriage registration. These factors operate across technological, institutional, social, and normative dimensions, creating a complex governance landscape that requires integrated policy responses.

First, infrastructure limitations represent a persistent barrier to equitable digital service delivery. Network connectivity issues affect system reliability, particularly in rural and remote areas where internet infrastructure remains underdeveloped (Atmaja et al., 2025). Technical disruptions can delay marriage registration processing and create frustration among service users, potentially undermining public confidence in digital systems. The digital divide thus intersects with existing socioeconomic disparities, raising concerns about whether technological modernization benefits all segments of Indonesian society equally (Piatnychuk et al., 2026).

Second, digital literacy among both service providers and service users varies considerably across different contexts. Studies document that while SIMKAH has been implemented successfully at many KUA offices, challenges persist in community understanding and use of digital applications (Rahmanda, 2025). Some marriage registrants, particularly older individuals and those from rural backgrounds, may lack familiarity with digital platforms, creating potential barriers to accessing services. Similarly, some KUA staff may require additional training to fully utilize system capabilities and troubleshoot technical issues.

Third, data protection and privacy concerns emerge as critical considerations as marriage registration generates and stores sensitive personal information. Indonesia's Personal Data Protection Law (Law No. 27/2022) establishes frameworks for safeguarding personal data, but implementation within religious administrative contexts remains evolving (Zahra, 2025). Marriage registration involves collection of extensive personal information including family background, previous marital history, and religious status, all of which require robust protection mechanisms. The integration of systems across agencies creates additional data flows that must be secured against unauthorized access or misuse.

Fourth, regulatory fragmentation complicates governance of AI-assisted marriage administration. Multiple regulatory instruments govern different aspects of the system, including marriage law provisions, religious affairs ministry regulations, data protection requirements, and e-government standards (Dubniak, 2025). Coordination among these frameworks is not always seamless, creating potential gaps or inconsistencies that affect implementation. The absence of specific regulations governing AI applications in religious administrative contexts leaves important questions unaddressed, including standards for algorithmic transparency and mechanisms for appealing automated decisions.

#### **4.3 Toward an Integrated Governance Framework**

The findings support development of an integrated governance framework that addresses both the opportunities and challenges of AI-based digital transformation in Islamic marriage registration. This framework draws upon maqasid al-shariah principles as normative foundations while incorporating contemporary governance standards for AI accountability and data protection.

From the perspective of maqasid al-shariah, digital transformation can serve fundamental Islamic legal objectives when properly designed and implemented. Protection of lineage (hifz al-nasl)

is enhanced when digital systems improve the reliability and accessibility of marriage registration, reducing instances where marriages go unrecorded and creating legal certainty for resulting family relationships (Muntazar & Soberi, 2026). Protection of dignity (*hifz al-'ird*) requires that digital systems incorporate robust privacy safeguards and prevent unauthorized disclosure of sensitive personal information. Protection of property (*hifz al-mal*) is served when digital efficiency reduces costs and administrative burdens for families seeking to register marriages. These alignments demonstrate that AI integration, when properly governed, can support rather than undermine Islamic legal objectives.

However, the framework must also address potential conflicts between technological optimization and religious authenticity. Concerns from Islamic legal scholars regarding online marriage processes illustrate broader questions about whether algorithmic verification can substitute for human religious judgment (Zakaria et al., 2025). Major Indonesian Islamic institutions including Nahdlatul Ulama, Muhammadiyah, and the Indonesian Ulema Council have developed positions on digital family law issues, reflecting ongoing scholarly engagement with these questions. The governance framework should incorporate mechanisms for ensuring that AI-assisted processes support rather than replace appropriate religious oversight of marriage validation.

The proposed framework encompasses five integrated components: (1) data governance protocols aligned with both Islamic privacy principles and statutory data protection requirements; (2) algorithmic accountability mechanisms ensuring transparency in automated decision processes; (3) institutional capacity building to enhance digital literacy among religious administrators; (4) inclusive access provisions addressing digital divide barriers; and (5) religious oversight structures maintaining alignment with Islamic legal principles. Implementation requires coordination among the Ministry of Religious Affairs, the Data Protection Authority, and recognized Islamic jurisprudential bodies to ensure coherent governance across technological and religious dimensions.

## 5. DISCUSSION

This research has examined the digital transformation of Islamic marriage registration in Indonesia through the lens of AI governance and Islamic legal principles. The findings reveal a complex picture in which technological modernization has generated substantial benefits while also creating new challenges requiring policy attention. SIMKAH implementation has demonstrably improved administrative efficiency, data accuracy, and service accessibility at KUA offices across Indonesia. The system enables cross-agency verification that reduces risks of document fraud and supports more reliable marriage documentation. These improvements align with government objectives for e-government transformation and respond to public expectations for accessible, efficient services.

Simultaneously, the research identifies persistent challenges that affect the sustainability and equity of digital transformation. Infrastructure limitations create uneven service quality across regions, with rural and remote areas experiencing connectivity issues that urban centers do not face. Digital literacy gaps among both service providers and users create barriers to effective system utilization. Data protection concerns remain inadequately addressed, with regulatory frameworks still adapting to the specific requirements of religious administrative contexts. These challenges require integrated policy responses that address technological, institutional, and social dimensions of digital transformation.

### 5.1 Contextualization within Indonesian Governance Landscape through Maqasid al-Shariah

The findings must be understood within the broader context of Indonesia's digital governance trajectory. The nation has made substantial commitments to e-government transformation, establishing policy frameworks and institutional mechanisms to support digitalization across public services (Muslih & Soesatyo, 2025). Islamic marriage registration operates within this broader ecosystem, subject to both religious affairs governance and general e-government standards. This dual positioning creates both opportunities and complications for governance design.

The Indonesian context also reflects distinctive features of legal pluralism in which Islamic law operates alongside national positive law in family matters (Imomov et al., 2026). Marriage registration

requirements emerge from this plural legal structure, combining religious validity requirements with state administrative procedures. Digital transformation must navigate this complexity, ensuring that technological systems support both dimensions of marriage legitimacy rather than privileging one at the expense of the other. The research suggests that current systems have achieved reasonable integration, but ongoing attention is required to maintain this balance as AI capabilities expand.

The findings support theoretical interpretation through the framework of *maqasid al-shariah*, demonstrating how this classical Islamic legal concept can provide evaluative criteria for contemporary technological governance. Digital transformation of marriage registration can serve each of the five essential objectives when properly designed: protection of religion (*hifz al-din*) through systems that support proper Islamic marriage procedures; protection of life (*hifz al-nafs*) through family stability enabled by legal marriage documentation; protection of intellect (*hifz al-'aql*) through transparent governance that maintains public understanding of administrative processes; protection of lineage (*hifz al-nasl*) through reliable registration that establishes legal family relationships; and protection of property (*hifz al-mal*) through efficient systems that reduce unnecessary costs (Wahab & Mahdiya, 2026).

This theoretical framework has broader implications for Islamic legal methodology in the digital era. Contemporary scholars have emphasized that *maqasid al-shariah* provides not merely passive evaluative criteria but active guidance for institutional design (Hassanein, 2025). The research contributes to this discourse by demonstrating how *maqasid* principles can be operationalized within specific governance contexts, moving from abstract objectives to concrete policy recommendations. This approach represents a form of contemporary *ijtihad* that integrates classical legal reasoning with modern institutional analysis (Kholil & Ramdhan, 2026).

The research advances understanding of how algorithmic governance operates within religious institutional contexts, an area that remains understudied in mainstream governance scholarship. AI-assisted administrative processes involve forms of automated decision-making that raise questions about accountability, transparency, and human oversight (Luna, 2025). When these processes occur within religious administration, additional dimensions emerge regarding the relationship between algorithmic determination and religious authority.

The findings suggest that current SIMKAH implementation primarily involves supportive digitalization rather than autonomous AI decision-making. The system assists human administrators with data management and verification but does not replace human judgment on matters of religious validity. This configuration aligns with governance principles emphasizing human-in-the-loop oversight for consequential decisions (Muslih & Soesaty, 2025). However, as AI capabilities advance, maintaining this configuration may require deliberate design choices and governance safeguards to prevent inappropriate delegation of religious determinations to algorithmic systems.

## 5.2 Comparison with International Experience

Comparative analysis reveals both common patterns and distinctive features in Indonesia's digital transformation of marriage registration. Common patterns include the central role of infrastructure development, the importance of digital literacy, and the need for data protection frameworks, challenges that appear across diverse national contexts implementing AI in public services (Sharmin & Chowdhury, 2025). International experiences from Estonia, Singapore, and European nations provide useful models for addressing these challenges, particularly regarding approaches to digital identity management and cross-agency data integration.

Distinctive features arise from the religious dimensions of Indonesian marriage administration. Unlike secular civil registration systems, Islamic marriage registration involves religious validity determinations that cannot be fully reduced to administrative verification. This creates requirements for governance frameworks that international models may not directly address. The research suggests that Indonesia must develop context-specific approaches that learn from international experience while adapting to local religious and institutional realities (Tohopi et al., 2025).

**Table 2: Summary of Key Findings and Recommendations**

Dimension	Current Status	Key Challenges	Recommendations
Administrative Efficiency	SIMKAH implementation has significantly improved processing times and standardized procedures (Atmaja et al., 2025)	Technical disruptions; Inconsistent utilization across regions	Continue infrastructure investment; Develop system reliability standards
Data Integration	Cross-agency verification with civil registry enables identity validation (Subeitan, 2024)	Data quality inconsistencies; Interoperability limitations	Strengthen data governance protocols; Enhance system integration
Digital Accessibility	Online registration expanded service reach	Digital divide affects rural populations; Literacy barriers	Inclusive design principles; Digital literacy training programs
Data Protection	Law No. 27/2022 provides general framework	Implementation gaps in religious contexts; Privacy vulnerabilities	Context-specific data protection protocols; Enhanced security measures
Religious Legitimacy	Human oversight maintained in current systems	Potential algorithmic encroachment on religious determinations	Preserve human-in-the-loop for religious judgments; Clear role delineation
Governance Framework	Multiple regulatory instruments apply	Fragmentation; Coordination gaps	Integrated governance framework; Designated oversight authority

The research generates implications across theoretical, practical, and policy dimensions. Theoretically, the study demonstrates the value of integrating Islamic legal philosophy with contemporary governance analysis, an interdisciplinary approach that enriches both fields. The application of maqasid al-shariah as governance criteria extends Islamic legal methodology to new domains while providing governance studies with normative frameworks attuned to religious values.

Practically, the findings provide guidance for KUA administrators and Ministry of Religious Affairs officials seeking to optimize digital transformation. Key recommendations include investment in infrastructure to address connectivity gaps, training programs to enhance digital literacy, and implementation of robust data protection protocols. The research also suggests the importance of maintaining human oversight of religiously consequential decisions, even as AI capabilities expand.

From a policy perspective, the findings support regulatory development that addresses current gaps in AI governance for religious administration. Specific recommendations include development of technical standards for SIMKAH and related systems, coordination mechanisms among regulatory authorities, and establishment of oversight bodies with appropriate Islamic legal expertise. These policy developments should proceed through collaborative engagement among government agencies, Islamic jurisprudential bodies, and technology stakeholders (Sulistyantoro et al., 2024).

## 6. CONCLUSION

This study demonstrates that the integration of artificial intelligence and digital governance into Islamic marriage registration has significantly transformed public religious administration in Indonesia. Through SIMKAH and AI-assisted verification systems, digitalization has improved administrative efficiency, accelerated registration processes, and strengthened the reliability of marriage documentation within the Office of Religious Affairs (KUA). The findings show that technological modernization can support the objectives of Islamic family law when implemented within frameworks aligned with maqasid al-shariah principles, particularly in ensuring legal certainty, protection of lineage, and institutional accountability in marriage administration.

The research contributes theoretically by developing an interdisciplinary framework that connects Islamic law, digital governance, and artificial intelligence within the context of religious administration. The study demonstrates that maqasid al-shariah can function as an evaluative framework for assessing digital governance systems, including issues of privacy protection, administrative transparency, and legal legitimacy. Methodologically, the use of a normative socio-legal approach enables a comprehensive analysis of both regulatory structures and practical implementation challenges, revealing the complexities of integrating digital technology into Islamic legal institutions in Indonesia.

The study further emphasizes the importance of inclusive and ethically grounded digital governance for Islamic marriage registration. Persistent challenges such as digital inequality, fragmented regulations, data privacy risks, and limited technological literacy require coordinated responses from policymakers, religious institutions, and technology developers. The research concludes that sustainable digital transformation in Islamic marriage administration depends on balanced governance that integrates technological innovation, Islamic legal principles, institutional supervision, and public accessibility. Future research should expand empirical analysis of user experiences and comparative studies across Muslim-majority countries to strengthen governance models for digital religious administration.

## 7. CRediT Author Statement

**M. Yahya Wahyudin:** Conceptualization, Methodology, Formal Analysis, Investigation, Data Curation, Writing – Original Draft, Visualization. **Tate AB:** Conceptualization, Validation, Resources, Writing – Review & Editing, Supervision, Project Administration. All authors have read and approved the final version of the manuscript. The authors agree to be accountable for all aspects of the work and have reviewed and approved the submitted version of the manuscript.

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