

Navigating the Pilgrimage: An Open Innovation Approach to Digitalizing Hajj Services in Indonesia

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Abstract

Purpose - This study aims to develop a strategic digital business transformation roadmap for Indonesia's Hajj and Umrah ecosystem through the lens of open innovation and the Dynamic Capabilities framework. It aims to modernize pilgrimage services by combining organizational capabilities with new technical advancements to assure long-term ecosystem sustainability.

Design/Methodology/Approach - The study employs a qualitative exploratory case study methodology focused on a focal pilgrimage financial agency. Data were gathered using a methodical four-phase methodology: a digital maturity assessment, expert Focus Group Discussions (FGDs) to evaluate company potential, priority assessment, and collaborative roadmap development with critical internal stakeholders and interdisciplinary experts.

Findings - The focal agency demonstrates a maturity level of "Embracing" with an average score of 66.35, indicating active digital integration into core operations. Hajj funding emerged as the primary priority for transformation. The resulting three-year roadmap outlines a transition from internal capability building to ecosystem co-creation and systemic reconfiguration.

Research limitations/implications - This study is confined to one primary institution inside a singular national context. Subsequent research ought to encompass a broader variety of stakeholders, including private travel providers and regulatory ministries, to substantiate the pathway across institutions.

Practical implications - The focal agency is recommended to transition from a conventional fund manager to an ecosystem orchestrator. It is advisable to establish a specialized corporate innovation institution to promote digital business expansion and navigate ecosystem intricacies.

Social Implications - Digitalization improves the pilgrim experience, promotes governance transparency, and aligns with the nation's vision by merging sacred services with the contemporary digital economy.

Originality/Value - This study presents a distinctive integrative framework that expands open innovation and ecosystem reconfiguration ideas into the inadequately explored domain of holy religious activities.

Keywords: Digital Business Transformation; Open Innovation; Hajj Ecosystem; Strategic Roadmap.

1 Introduction

Digital transformation has emerged as a fundamental strategic agenda for public organizations and community service institutions globally (Karabag et al., 2026; Schallmo & Williams, 2018). It is defined as a deliberate and ongoing digital evolution that leverages technologies to radically improve organizational performance, governance transparency, and user experience (Rmili et al., 2025; Schallmo & Williams, 2018; Y. Wang et al., 2025). Beyond routine administrative automation, digital tools like real-time analytics and Artificial Intelligence (AI) allow institutions to redefine their value propositions and increase operational efficiency (Xing et al., 2026; Zhao et al., 2026). Even highly traditional sectors, including religious services and pilgrimage management, are now undergoing this shift through integrated service platforms and complex digital ecosystems (Ragab, 2025; Rmili et al., 2025). Consequently, digital transformation is no longer viewed merely as a set of isolated technological upgrades but has become an integral part of strategic institutional development (Karabag et al., 2026; Luo et al., 2026).

The Hajj and Umrah organization represent an inherently complex service system involving a vast array of actors, including government ministries, financial management agencies, private travel providers, and millions of pilgrims (Rmili et al., 2025; Sulaiman et al., 2026). This complexity is continuously escalating due to the rapid growth in pilgrim numbers—projected to reach 30 million annually by 2030—and the critical need for governance transparency and accountability in managing massive logistical and financial flows (Ragab, 2025; Sopyan et al., 2023). Within the context of Indonesia, which maintains the world's largest market share for Hajj, managing this ecosystem requires robust governance, coordination, and technological integration (Sopyan et al., 2023). Therefore, digitalization has become a pivotal strategic approach to enhance the effectiveness of pilgrimage management (Gunawan, 2023; Ragab, 2025).

In Indonesia, the stewardship of Hajj funds is conducted by the Hajj Financial Management Agency (BPKH),

an independent public institution legally tasked with managing assets based on Sharia principles, transparency, and accountability (Sopyan et al., 2023; C. Wang & Thai, 2026). The Hajj funds under BPKH's management have reached a massive scale, totalling IDR 159.6 trillion by August 2023, and they play a fundamental role in ensuring the sustainability of Hajj operations (Gunawan, 2023; C. Wang & Thai, 2026). With such a significant role, BPKH has evolved beyond its primary function as a financial manager to become a strategic actor and essential driver in the development and optimization of the Hajj and Umrah service ecosystem (Gunawan, 2023; Sopyan et al., 2023; C. Wang & Thai, 2026).

The rapid advancement of digital technologies presents unprecedented opportunities to modernize services within the Hajj ecosystem. Potential digitalization spans several domains, including AI-powered smart booking, digitalized Hajj fund management, and integrated "Super Apps" that facilitate data integration across diverse institutions (Gunawan, 2023; Sopyan et al., 2023). Furthermore, the emergence of Sharia-compliant fintech solutions and digital payment systems can streamline payment processes and create new digital business opportunities that bolster the long-term sustainability of the Hajj value chain (L. Wang et al., 2026). This transformation not only increases operational productivity but also improves the pilgrim experience through personalized and data-driven services (Y. Wang et al., 2025; Zhao et al., 2026).

Despite these vast opportunities, digital transformation cannot be executed in a sporadic manner; nearly 70% to 80% of digital transformation projects fail to reach their intended outcomes due to persistent integration and alignment challenges (Karabag et al., 2026; Mann et al., 2022). Many organizations face significant hurdles, including structural inertia, fragmented systems, and a lack of strategic priority in developing digital innovations (Karabag et al., 2026; Schmeisser et al., 2026). Consequently, a systematic approach is essential to evaluate an organization's digital maturity and identify relevant business opportunities (Shatila et al., 2025; Tricahyono et al., 2026). This structured methodology ensures that any resulting roadmap is strategically aligned with the institution's resource endowments and long-term objectives (Hafeez et al., 2025; Xing et al., 2026).

One of the strategic frameworks increasingly used to navigate this transformation is open innovation. This concept emphasizes how organizations create and capture value by integrating knowledge and resources from both internal and external sources (Liu et al., 2025; Tricahyono et al., 2026). In the context of the Hajj ecosystem—which requires shared value propositions impossible for any single actor to deliver alone—open innovation enables the integration of public institutions, private providers, and technology partners (Sopyan et al., 2023; Tricahyono et al., 2026). By fostering co-creation, open innovation serves as a robust framework for developing digital business models that are more inclusive and adaptive to the needs of the pilgrims and the regulatory environment (Engidaw et al., 2026; Tricahyono et al., 2026).

Although studies concerning digital transformation and open innovation have advanced rapidly, research specifically examining digital business development within the Hajj ecosystem remains extremely limited (Sopyan et al., 2023). Current Hajj-related research is largely concentrated on domains like travel management, health protocols, or public policy, while the dimensions of ecosystem innovation and digital business transformation have been significantly neglected (Rmili et al., 2025; Sopyan et al., 2023; Tricahyono et al., 2026). Furthermore, there is a notable absence of integrative research that combines digital maturity assessment with strategic roadmap development specifically tailored for pilgrimage services (Sopyan et al., 2023; Tricahyono et al., 2026). Building upon these foundational premises and addressing the identified research gaps, this study is designed to formulate a strategic digital business transformation roadmap for Indonesia's Hajj ecosystem through the lens of open innovation.

2 Literature Review

Current scholarship defines digital transformation not merely as a discrete technological upgrade but as a fundamental, system-level change process that reshapes strategic intent, organizational structures, and value propositions (Karabag et al., 2026; Xing et al., 2026). Literature suggests that for established institutions with legacy systems, this transformation is an ongoing, iterative journey that often unfolds through distinct phases—such as experimentation, consolidation, and acceleration (Karabag et al., 2026). Because these processes are non-linear and deeply context-dependent, researchers emphasize the need for qualitative exploratory designs to capture the interpretive depth of how organizations navigate these shifts (Karabag et al., 2026; Tricahyono et al., 2026). This justifies the use of a case study approach to investigate the Hajj Financial Management Agency (BPKH) as a representative "born-analog" institution undergoing digital evolution (Schmeisser et al., 2026).

2.1 *Assessing Digital Reality through Maturity Models*

A critical prerequisite for any strategic roadmap is the diagnosis of an organization's current status, often referred to in the literature as its "Digital Reality" (Kreutzer et al., 2018; Schallmo & Williams, 2018). Digital Maturity Models (DMM) provide the necessary evaluative framework to analyze multiple dimensions—such as strategy, leadership, operations, and technology—across various levels of expression, from "unaware" to "transformed" (Kreutzer et al., 2018; Silverman, 2017). By identifying specific competency gaps and optimization potentials, the DMM serves as the foundational diagnostic tool that informs the subsequent phases of roadmap development (Kreutzer et al., 2018).

2.2 *Dynamic Capabilities: Sensing, Seizing, and Reconfiguring*

To explain how organizations sustain competitiveness amid digital disruption, this study draws on the Dynamic Capabilities (DC) framework (Fawaid et al., 2026; Hafeez et al., 2025). The DC lens identifies three core functions essential for transformation:

1. Sensing: The ability to scan and monitor the environment to detect emerging technological trends and market opportunities (Hafeez et al., 2025; Tricahyono et al., 2026).
2. Seizing: The mobilization of resources to capture identified value, often through business model co-creation (Hafeez et al., 2025).
3. Reconfiguring: The continuous alignment of organizational assets and structures to maintain fitness in a changing landscape (Hafeez et al., 2025; Tricahyono et al., 2026). In this research, these functions drive the operational phases: sensing identifies the "Digital Potential" of the ecosystem; while seizing and reconfiguring establish the "Digital Fit" and implementation strategy (Schallmo & Williams, 2018).

2.3 *Open Innovation in Multi-Actor Ecosystems*

The management of Hajj and Umrah services occurs within a complex business ecosystem characterized by high interdependence among heterogeneous actors (Sopyan et al., 2023; Tricahyono et al., 2026). Literature on Open Innovation (OI) posits that in such environments, value is best created by integrating knowledge and resources from both internal and external sources (Tricahyono et al., 2026). This requires ecosystem orchestration, where a focal actor coordinates diverse stakeholders to achieve a shared value proposition (Liu et al., 2025; Mann et al., 2022). Because successful OI depends on trust, collaboration, and participatory validation, a methodology involving stakeholder engagement and Focus Group Discussions (FGDs) is essential to ensure the roadmap's feasibility and inclusive nature (Sopyan et al., 2023; Tricahyono et al., 2026).

2.4 *Synthesis and Methodological Justification*

While existing studies have examined digital transformation and open innovation separately, there is a clear theoretical gap in integrating these concepts into a structured roadmap for religious service ecosystems (Tricahyono et al., 2026). The literature suggests that when "little is known" about a specific phenomenon, theory building through case studies is the most appropriate strategy (Gupta & Awasthy, 2015; Mann et al., 2022). Therefore, this study adopts a four-phase methodology—ranging from maturity assessment to collaborative roadmap design—as a systematic way to translate these theoretical constructs into a localized strategic blueprint for Indonesia's Hajj ecosystem (Tricahyono et al., 2026; Xing et al., 2026).

3 **Method**

3.1 *Research Setting and Informants*

The research focuses on the Hajj Financial Management Agency (BPKH) as the focal organization and

orchestrator within Indonesia's Hajj ecosystem (Sopyan et al., 2023). To ensure the collection of strategic and operational insights, purposive sampling was employed to select nine key stakeholders from BPKH (Gupta & Awasthy, 2015; Shonubi, 2025). The informant group consists of:

- 2 Top Leaders to provide high-level strategic vision and institutional commitment.
- 3 Senior Leaders to offer insights into cross-functional coordination and ecosystem-wide goals.
- 4 Managers to provide operational perspectives on technical implementation and process requirements.

3.2 Data Collection Techniques

Data were systematically collected through three complementary techniques to ensure triangulation and analytical depth (Luo et al., 2026; Mann et al., 2022; Shonubi, 2025):

1. Semi-structured Interviews: Conducted with all nine informants to explore perceptions of digital maturity, potential business opportunities, and structural barriers (Mann et al., 2022; Tricahyono et al., 2026; Zhao et al., 2026).
2. Document Analysis: Review of internal reports, BPKH strategic plans, and relevant Hajj regulations to establish a contextual baseline (Karabag et al., 2026; Shonubi, 2025; Tricahyono et al., 2026).
3. Focus Group Discussions (FGD): Utilized in the final phase as a forum for participatory validation and co-creation of the transformation roadmap (Flick, 2014; Tricahyono et al., 2026).

3.3 Operational Research Phases

The research followed a systematic four-phase approach, integrating the Digital Maturity Model (DMM) with a structured Digital Transformation Roadmap (DTR) framework (Kreutzer et al., 2018; Schallmo & Williams, 2018).

- Phase I: Digital Maturity Competencies Assessment (Digital Reality). The objective was to diagnose BPKH's current status or its "Digital Reality" (Schallmo & Williams, 2018). This study utilizes the Digital Maturity Framework developed by Contentious Ltd, which is accessible at <https://digitalmaturity.org/digital-maturity-framework/>. The framework evaluates 17 critical competencies (including Culture, Leadership, Collaboration, Budget, Innovation, Capacity, Recruitment, Learning, Project Management, Technology, Data, Reporting, Insight, Communication, Optimisation, Internal Systems, and Service Delivery). Informants assessed the agency across seventeen critical competencies (Table 1) using five levels of expression ranging from "Unaware" to "Transformed" (Kreutzer et al., 2018).
- Phase II: Expert FGD for Business Potential (Digital Potential). Using the "Sensing" function of dynamic capabilities, an Expert Focus Group Discussion identifies emerging technological trends and open innovation opportunities, such as Sharia-fintech and integrated service platforms (Schallmo & Williams, 2018; Tricahyono et al., 2026).
- Phase III: Priority Assessment for Digital Business Development (Digital Fit). This phase evaluated which initiatives offered the best "Digital Fit" (Schallmo & Williams, 2018). Initiatives were prioritized based on their alignment with strategic objectives, pilgrim requirements, and operational feasibility (Schallmo & Williams, 2018).
- Phase IV: Collaborative Roadmap Development (Digital Implementation). The final phase utilized the FGD results to finalize a phased rollout plan—detailing specific projects and the transition from "analog" to "digital" participation—constituting the "Digital Implementation" stage (Luo et al., 2026; Mann et al., 2022; Schallmo & Williams, 2018).

Digital Maturity Competencies	Maturity Level				
	Level 1	Level 2	Level 3	Level 4	Level 5
01. Culture	Sceptical	Respectful	Participative	Inclusive	Fundamental
02. Leadership	Minimal	Restricted	Supported	Elevated	Intrinsic
03. Collaboration	Siloed	Synchronised	Planned	Integrated	Audience-first
04. Budget	Survival	Maintenance	Experimenting	Growth	Sustainable
05. Innovation	Deprioritised	Ad hoc	Small-scale	Coordinated	Embedded

06. Capacity	Responsibility	Expertise	Team	Function	Capability
08. Recruitment	Essential	Specialist	Generalist	Prevalent	Pervasive
08. Learning	Skill-sharing	Building literacy	Centralised	Multi-layered	Cultural
09. Project Management	Inconsistent	Basic	Progressing	Developing	Impactful
10. Technology	Primitive	Outdated	Keeping up	Effective	Leading edge
11. Data	Chaotic	Understood	Developing	Literate	Driven
12. Reporting	Sporadic	Tactical	Aggregated	Integrated	Real-time
13. Insight	Gathering	Understanding	Analysing	Acting on	Learning from
14. Communications	Unspecific	Consultative	Inclusive	Strategic	Transformational
15. Optimisation	Non-existent	Ad-based	Journey-based	Product-based	Organisation-based
16. Internal systems	Inefficient	Inconsistent	Discretionary	Effective	Efficient
17. Service delivery	Basic	Supplementary	Equal	Insight-driven	Innovative

Table I : Digital Maturity Competencies Dimention

Source : Contentious Ltd, which is accessible at <https://digitalmaturity.org/digital-maturity-framework/>

3.4 Data Analysis Method

Data were analyzed using thematic analysis followed a rigorous three-stage coding process:

1. Open Coding: Identifying emergent substantive categories such as "platform interoperability" and "governance barriers" (Karabag et al., 2026; Tricahyono et al., 2026; Zhao et al., 2026).
2. Axial Coding: Grouping codes into higher-level theoretical constructs related to sensing, seizing, and reconfiguring (Karabag et al., 2026; Tricahyono et al., 2026).
3. Selective Coding: Integrating these categories to finalize the conceptual roadmap and ensure the findings were grounded in the empirical evidence (Tricahyono et al., 2026).

To ensure research rigor, the study employed member checking with senior management and an audit trail to document all analytical decisions (Karabag et al., 2026; Tricahyono et al., 2026)

4 Result and Discussion

4.1 Phase I: Digital Maturity Assessment

The initial phase diagnosed BPKH's "Digital Reality" across 17 competencies (Table 2). The assessment revealed an overall maturity score of 66.35, characterizing BPKH as being at Level 4 ("Embracing") on a 1–5 scale. This indicates that BPKH is actively utilizing digital technologies to improve efficiency and effectiveness.

Digital Maturity Competencies	Result		Maturity Level				
	Score	Rank	Level 1	Level 2	Level 3	Level 4	Level 5
01. Culture	72.89	Inclusive	Sceptical	Respectful	Participative	Inclusive	Fundamental
02. Leadership	65.33	Elevated	Minimal	Restricted	Supported	Elevated	Intrinsic
03. Collaboration	67.56	Integrated	Siloed	Synchronised	Planned	Integrated	Audience-first
04. Budget	64.89	Growth	Survival	Maintenance	Experimenting	Growth	Sustainable
05. Innovation	64.00	Coordinated	Deprioritised	Ad hoc	Small-scale	Coordinated	Embedded
06. Capacity	64.00	Function	Responsibility	Expertise	Team	Function	Capability
08. Recruitment	70.22	Prevalent	Essential	Specialist	Generalist	Prevalent	Pervasive
08. Learning	61.78	Multi-layered	Skill-sharing	Building literacy	Centralised	Multi-layered	Cultural
09. Project Management	66.22	Developing	Inconsistent	Basic	Progressing	Developing	Impactful
10. Technology	65.78	Effective	Primitive	Outdated	Keeping up	Effective	Leading edge

11. Data	64.89	Literate	Chaotic	Understood	Developing	Literate	Driven
12. Reporting	61.78	Integrated	Sporadic	Tactical	Aggregated	Integrated	Real-time
13. Insight	64.89	Acting on	Gathering	Understanding	Analysing	Acting on	Learning from
14. Communications	67.11	Strategic	Unspecific	Consultative	Inclusive	Strategic	Transformational
15. Optimisation	64.89	Product-based	Non-existent	Ad-based	Journey-based	Product-based	Organisation-based
16. Internal systems	68.00	Effective	Inefficient	Inconsistent	Discretionary	Effective	Efficient
17. Service delivery	73.78	Insight-driven	Basic	Supplementary	Equal	Insight-driven	Innovative
Average Score	66.35	EMBRACING					

Table 2: Digital Maturity Competencies Assessment

Strategic analysis of individual competencies shows that Service Delivery (73.78) and Culture (72.89) are the strongest dimensions, categorized as "Insight-driven" and "Inclusive," respectively. This suggests that digital success is seen as key to the organization and is being incorporated into its core operations. Conversely, areas such as Learning (61.78) and Reporting (61.78) received the lowest scores, indicating a need for more structured digital upskilling and better access to holistic performance data. Experts noted that while BPKH's culture is changing to become more data-driven, a comprehensive survey between departments is still required to eliminate subjectivity in future assessments.

4.2 Phase II & III: Digital Potential and Priority Assessment

Based on participant perceptions and expert discussions, the study established the "Digital Potential" for the Hajj and Umrah value chain. The assessment identified a wide range of services suitable for digital business transformation, including banking/financing, hotel/apartment services, catering, travel agencies, and airlines.

Through a priority assessment, Funding the Hajj pilgrimage was identified as the top priority for transformation into a digital business service (Figure 1). This aligns with BPKH's core mandate as a financial steward. Rank-ordered as the second most critical and urgent priorities were airline services, hotel/apartment accommodations, catering, and travel agencies. These findings highlight a strategic shift from BPKH acting solely as a fund manager toward becoming an orchestrator of the entire pilgrimage experience through digital integration.



Note: Illustration created by the authors

Figure 1: Priority Assessment for Digital Business Development of Hajj and Umrah Services

4.3 Phase IV: Digital Business Development Roadmap (Digital Implementation)

The final phase culminated in a three-year roadmap (2024–2027) designed to disrupt and transform the Hajj ecosystem through an open innovation approach. The roadmap follows a phased progression:

- Year 1 (Mindset and Pilot): Focuses on strengthening the mindset, skillset, and toolset of BPKH employees. This internal capability building is coupled with the initiation of pilot projects in digital business development to test new innovation process models.
- Year 2 (Sensing and Co-creation): Shifts focus toward the external ecosystem by conducting research on pilgrim pain points (customer experience). Simultaneously, BPKH aims to initiate

innovation models such as hackathons, incubators, and accelerators to search for new value creation opportunities.

- Year 3 (Disruption and Reconfiguration): The goal is the systemic disruption of the Hajj and Umrah business ecosystem, transitioning toward a fully digitalized service landscape.

4.4 Discussion: Toward Ecosystem Orchestration

The results suggest that BPKH's "Embracing" maturity level provides a solid foundation for its role as a digital leader. However, to move from Level 4 to Level 5 ("Fundamental/Innovative"), BPKH must act as an "Essential Player" or orchestrator within the ecosystem. The recommendation to establish a corporate innovation institution is critical; such an entity would spark the growth of digital businesses and support Indonesia's "Golden Indonesia 2045" vision.

The roadmap emphasizes that digital transformation in this sacred context is not merely about technology but about reconfiguring the value chain. By sensing pilgrim needs in Year 2 and seizing opportunities through open innovation, BPKH can mitigate the inherent complexity of the Hajj organization. Ultimately, the transition from financial management to ecosystem orchestration allows for the creation of a "Super App" or integrated digital platform that addresses the logistical and financial requirements of millions of pilgrims.

5 Conclusion

This study successfully designed a comprehensive digital business transformation roadmap for Indonesia's Hajj ecosystem using an Open Innovation perspective. The main conclusions of this research address the four previously established research objectives. First, the digital maturity assessment reveals that BPKH is currently at Level 4 ("Embracing") with an average score of 66.35. This indicates that the organization is actively utilizing digital technology to enhance its operational efficiency and effectiveness. While strengths were identified in Service Delivery and an increasingly data-driven Organizational Culture, systemic gaps remain in digital learning and reporting that require further development. Second, through the "sensing" process within the Dynamic Capabilities framework, this research identified significant digital business potential across the Hajj and Umrah value chain, including banking/financing, accommodation, transportation, catering, and healthcare. These findings confirm that digital transformation in this sector extends beyond administrative efficiency to include business model innovations that can bolster Indonesia's digital economy in alignment with the "Golden Indonesia 2045" vision.

Third, the priority assessment established Hajj Funding as the primary priority for digital business transformation. This is followed by other critical sectors such as airlines, hotels/apartments, catering, and travel agencies. These priorities signal a necessary strategic shift for BPKH, moving from its traditional role as a fund manager to becoming an ecosystem orchestrator that integrates various actors through a unified digital platform. Fourth, the study produced a Digital Business Development Roadmap divided into three strategic stages: (i) mindset and pilot, (ii) sensing and co-creation, and (iii) disruption and reconfiguration.

Theoretically, this study demonstrates that innovation inclusivity in the religious public service sector depends on achieving symmetry between data and cultural values through hybrid collaboration. Practically, it is strongly recommended that BPKH establishes a corporate innovation institution to spark and sustain the growth of digital businesses within the pilgrimage ecosystem.

This research is limited by its focus on a single focal organization. Future studies should involve a broader range of stakeholders, including government ministries and private service providers, to validate this roadmap cross-institutionally. Additionally, synchronizing the roadmap with the dynamic regulatory environment of Saudi Arabia remains a critical challenge for successful future implementation.

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