

ENHANCING EFFICIENCY OF INNOVATION MANAGEMENT IN THE HOSPITALITY INDUSTRY THROUGH DIGITAL SYSTEMS

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Abstract

Innovation management has become a decisive determinant of competitiveness in the hospitality industry, yet many firms struggle to translate technological investment into measurable efficiency gains. This article examines how digital systems—including property management systems, big data analytics, artificial intelligence (AI), and Internet of Things (IoT) infrastructures—enhance the efficiency of innovation management in hotels and related service firms. Using a systematic review of 38 peer-reviewed studies published between 2018 and 2026, the analysis synthesises empirical and conceptual evidence through the theoretical lenses of dynamic capabilities and technology acceptance. The findings indicate that digital systems improve innovation efficiency through three interrelated mechanisms: accelerated sensing of market opportunities, faster seizing of innovation through data-driven decision-making, and continuous organisational transformation enabled by digital leadership and knowledge management. However, realising these benefits is contingent on organisational readiness, leadership commitment, employee acceptance, and supportive cultures rather than technology alone. The study contributes an integrative framework linking digital systems to innovation efficiency and offers implications for hospitality managers.

Keywords

innovation management; digital transformation; hospitality industry; dynamic capabilities; operational efficiency; artificial intelligence

1. Introduction

The hospitality industry operates in an environment of intensifying competition, volatile demand, and rapidly rising guest expectations, conditions that make sustained innovation a strategic imperative rather than an option. Digital transformation has accelerated markedly since the COVID-19 pandemic, reframing technology adoption as a central pillar of competitive strategy in hotels and tourism firms (Cheng et al., 2023). Smart hospitality—built on the interconnection

and interoperability of IoT, big data, AI, and mobile technologies – has emerged as the dominant paradigm for delivering personalised, efficient, and sustainable guest experiences (Buhalis & Leung, 2018). Within this paradigm, the central managerial challenge is no longer whether to adopt digital systems, but how to manage innovation efficiently so that technological investment yields measurable operational and strategic returns.

Despite substantial investment, a persistent gap remains between technology adoption and innovation efficiency. Many hospitality firms acquire digital systems without the organisational capabilities, leadership, or cultural conditions required to convert them into innovation outcomes (Ben Ghanem, 2025; Godolja et al., 2025). A recent seventeen-year bibliometric analysis confirms that the field has evolved from predicting information and communication technology adoption toward understanding digitally mediated service-ecosystem transformation, signalling a shift in scholarly attention from acquisition to value realisation (Park & Lee, 2026). This evolution highlights the need to examine innovation management efficiency as a distinct construct shaped by both technological and organisational factors.

Innovation management efficiency, in this context, refers to the capacity of a firm to convert innovation inputs—technology, knowledge, and managerial effort—into valuable innovation outcomes with minimal waste of time and resources. In hospitality, where margins are thin and service delivery is simultaneous with consumption, even incremental gains in this conversion ratio can yield significant competitive advantage. Digital systems are widely promoted as the primary means of improving this ratio, because they automate routine tasks, generate real-time intelligence, and enable scalable personalisation (Anwar et al., 2024; Zainunnuri, 2025). Yet the relationship between digital investment and innovation efficiency is neither automatic nor uniform across firms, which motivates a systematic examination of both the enabling technologies and the conditions under which they deliver value.

Accordingly, this article addresses the research question: *How do digital systems enhance the efficiency of innovation management in the hospitality industry, and what organisational conditions moderate this relationship?* The study makes three contributions. First, it synthesises fragmented empirical evidence into an integrative framework grounded in dynamic capabilities theory (Teece, 2018). Second, it distinguishes the technological enablers of innovation efficiency from the organisational conditions that determine whether those enablers succeed. Third, it identifies research gaps that are particularly relevant for doctoral inquiry into digitalised innovation management in hospitality.

2. Methods

This study adopts a systematic literature review (SLR) design, an approach well suited to consolidating dispersed and methodologically diverse evidence into a coherent theoretical synthesis (Ratna et al., 2024). The review followed three sequential stages: planning, conducting, and reporting. In the planning stage, the research question and inclusion criteria were defined. Studies were eligible if they (a) were peer-reviewed journal articles or scholarly reviews, (b) addressed digital systems, innovation management, or technology adoption in hospitality, tourism, or analogous service contexts, and (c) were published between 2018 and 2026 to capture contemporary digital transformation.

In the conducting stage, literature was identified through major academic databases and publishers, including Elsevier, Emerald, Springer, Taylor & Francis, Sage, and MDPI, using combinations of search terms such as "innovation management," "digital transformation," "smart hospitality," "dynamic capabilities," "technology adoption," and "operational efficiency." After screening for relevance and removing duplicates, a final corpus of 38 studies was retained for analysis. The corpus spans empirical studies employing partial least squares structural equation modelling (PLS-SEM), qualitative case studies, and conceptual frameworks, providing methodological triangulation.

In the reporting stage, a thematic synthesis was conducted. Each study was coded against recurring constructs and then mapped to the sensing, seizing, and transforming dimensions of the dynamic capabilities framework (Kump et al., 2019; Teece, 2018), complemented by the Technology Acceptance Model and the Unified Theory of Acceptance and Use of Technology as adoption lenses (El Archi & Benbba, 2023). This dual-theory structure enables the analysis to address both organisational capability and individual acceptance, the two dimensions most frequently cited as determinants of innovation efficiency.

3. Results

3.1 Digital Systems and Operational Efficiency

The reviewed evidence consistently links digital systems to measurable efficiency gains. Cloud-based property management systems have been associated with operational efficiency improvements of up to 30 percent, while AI chatbots reduced staff workload substantially and big data analytics improved guest satisfaction in five-star hotels (Anwar et al., 2024). In facility management settings, digital transformation explained between 83 and 89 percent of the variance in operational efficiency, with guest expectations and technical support emerging as the strongest adoption drivers (Ahamioje & Adedokun, 2025). Comparative analysis of European hotels demonstrated concrete returns, including a 26.5 percent increase in service revenue and a four-year payback period for digital platform

adoption (Vovk et al., 2025). Digitalisation combined with supply-chain integration further improved service quality and employee satisfaction in resource-constrained markets (Olusegun et al., 2025).

3.2 Data-Driven Innovation and Decision-Making

Big data analytics capability (BDAC) and AI capability function as engines of innovation efficiency. Organisational readiness and competitive pressure promote BDA adoption, which in turn improves financial performance, customer retention, and reputation (Carneiro et al., 2023). In Malaysian hotels, BDAC and AI capability mediated the relationship between entrepreneurial orientation and co-innovation, ultimately driving performance (Naz et al., 2023). Advanced analytics applied to web-behavioural data enabled real-time, knowledge-based digital innovation in luxury hotels (Reklitis et al., 2025). In revenue management, the integration of explainable AI is expected to enhance operational efficiency and decision quality, although awareness among professionals remains limited and human-algorithm interaction introduces cognitive biases such as anchoring and overconfidence (Mohammed & Denizci Guillet, 2024, 2025).

3.3 Organisational Capabilities and Leadership

Innovation efficiency depends heavily on dynamic capabilities and leadership. Digital dynamic capability positively influences sustainable performance through green knowledge management and technology innovation (Al-Husain et al., 2025), while knowledge management capability drives innovation performance through intellectual capital and knowledge utilisation (Hasanein & Al-Romeedy, 2026). Digital leadership exerts both a direct effect on digital transformation and indirect effects through AI productivity and innovation enablement (Seraj et al., 2025), and it enhances sustainable competitive advantage via green absorptive capability and eco-innovation (Hussein et al., 2024). The Dynamic Capabilities for Open Innovation framework further clarifies how sensing, seizing, and transforming jointly enable firms to integrate external knowledge (Bashir & Alsaeed, 2026). Service innovation ambidexterity—pursuing incremental and radical innovation simultaneously—improves service design outcomes (Tajeddini et al., 2024), and intellectual capital strengthens service innovation when mediated by dynamic capabilities (Zhang et al., 2026; Sadiq et al., 2025).

3.4 Technology Acceptance and Human Factors

Even well-designed digital systems fail without user acceptance. Reviews confirm that the Technology Acceptance Model and UTAUT remain the dominant frameworks for explaining adoption in hospitality (El Archi & Benbba, 2023; Park & Lee, 2026). In smart hotels, usability and reliability are the strongest service attributes, and technology acceptance mediates the path from adoption to

operational efficiency and guest satisfaction (Zainunnuri, 2025). Behavioural intention and habit most strongly shape AI usage among hotel employees (Gajić et al., 2024), while emerging technologies such as generative AI, service robots, and the metaverse follow established diffusion patterns shaped by demographics and perceived value (Fakfare et al., 2024; Binesh & Baloglu, 2023; Kontis & Ioannidis, 2025). Importantly, employee emotions such as anger and fear can impede IT adoption, underscoring the human dimension of innovation efficiency (Zheng & Montargot, 2022). Extended UTAUT models also explain a majority of adoption variance in sharing-economy platforms (Tamilmani et al., 2020).

3.5 Barriers and Adoption Segments

Adoption is uneven across firms. A large study of accommodation providers identified three segments—Tech Leaders, Selective Adopters, and Skeptics—of which only Tech Leaders reliably translated intention into actual adoption, with competitive pressure driving perceived usefulness (Godolja et al., 2025). Open innovation through external openness, R&D activity, and social media facilitates external knowledge acquisition and co-creation (Iglesias-Sánchez et al., 2020), while digital business ecosystems enhance supply-management performance through service-integration capability (Demir, 2026). Organisational agility is increasingly positioned as the mediating mechanism linking digital transformation to sustainable outcomes (Sharma et al., 2026; Ramirez et al., 2025).

4. Discussion

The synthesis reveals that digital systems enhance innovation management efficiency through three reinforcing mechanisms that align with the dynamic capabilities framework. First, digital systems accelerate *sensing* by converting big data, behavioural signals, and AI insights into rapid identification of market opportunities and guest needs (Carneiro et al., 2023; Reklitis et al., 2025). Second, they strengthen *seizing* by enabling faster, evidence-based innovation decisions, exemplified by AI-supported revenue management and analytics-driven service design (Mohammed & Denizci Guillet, 2025; Naz et al., 2023). Third, they support continuous *transforming* when paired with digital leadership, knowledge management, and organisational agility (Seraj et al., 2025; Hasanein & Al-Romeedy, 2026; Sharma et al., 2026).

A central insight is that technology is necessary but not sufficient for innovation efficiency. The evidence repeatedly shows that organisational readiness, leadership commitment, culture, and employee acceptance moderate whether digital systems generate innovation returns (Ben Ghanem, 2025; Wang et al., 2025; Zheng & Montargot, 2022). Firms that invest in technology without building dynamic capabilities or addressing human factors risk becoming Selective

Adopters or Skeptics who fail to realise value (Godolja et al., 2025). This finding reframes innovation efficiency as a socio-technical achievement rather than a purely technological one, consistent with the integrative perspective emerging in the literature (Ratna et al., 2024; Park & Lee, 2026).

For practice, these results imply that hospitality managers should sequence digital investment alongside capability building: developing data literacy, cultivating digital leadership, redesigning processes, and managing the emotional and cognitive responses of employees to new systems. Investments in explainable and transparent AI may further improve trust and adoption in decision-critical functions such as revenue management (Mohammed & Denizci Guillet, 2025). The strong returns documented in several contexts (Anwar et al., 2024; Vovk et al., 2025) suggest that the business case for digital innovation is robust when accompanied by organisational alignment.

Theoretically, the analysis supports an integrative model in which technology acceptance and dynamic capabilities operate at complementary levels. Acceptance theories explain adoption at the individual level, clarifying why employees and guests embrace or resist new systems (El Archi & Benbba, 2023; Gajić et al., 2024), whereas dynamic capabilities theory explains value creation at the organisational level, clarifying how firms reconfigure resources to innovate continuously (Kump et al., 2019; Bashir & Alsaeed, 2026). Connecting these levels addresses a recurring fragmentation in the literature, where studies tend to privilege one perspective at the expense of the other (Park & Lee, 2026). For current research, this integration suggests fruitful multilevel designs that simultaneously model individual acceptance and organisational capability as joint determinants of innovation efficiency.

5. Conclusion

This article examined how digital systems enhance the efficiency of innovation management in the hospitality industry. Synthesising 38 contemporary studies, it demonstrated that digital systems improve innovation efficiency by accelerating sensing, strengthening seizing, and enabling transforming, but only when supported by dynamic capabilities, digital leadership, supportive cultures, and user acceptance. The proposed framework integrates technological enablers with organisational moderators, offering a more complete account of innovation efficiency than technology-centric perspectives.

The study has limitations inherent to systematic reviews, including dependence on published evidence and the heterogeneity of measures across studies. Future research should pursue longitudinal and mixed-methods designs that measure innovation efficiency directly, test the moderating role of

organisational readiness, and examine emerging technologies such as generative AI and the metaverse in real operational settings (Fakfare et al., 2024; Kontis & Ioannidis, 2025). Such work would advance both theory and the practical management of digitalised innovation in hospitality.

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