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From Smart Tools to Superior Satisfaction: Examining the Role of Digital Innovation Variety in Enhancing Service Delivery Outcomes in Hotels

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Abstract

The increasing integration of digital technologies into hotel operations has transformed service delivery processes and reshaped customer expectations, making digital innovation a critical determinant of competitiveness in the hospitality industry. This study examined the effect of digital innovation variety on service delivery outcomes, customer satisfaction, and customer loyalty among hotel customers and employees. Guided by the Resource-Based View (RBV), Service-Dominant Logic (SDL), and the Technology Acceptance Model (TAM), the study adopted a quantitative cross-sectional survey design involving 500 respondents, comprising hotel guests (64%), managers (18%), and front-office employees (18%) from three-, four-, and five-star hotels. Data were analyzed using descriptive statistics, reliability and validity assessments, correlation analysis, and Structural Equation Modeling (SEM). The results revealed high levels of digital innovation variety (M = 4.12), service efficiency (M = 4.05), service quality (M = 4.10), customer experience (M = 4.18), customer satisfaction (M = 4.22), and customer loyalty (M = 4.15). Reliability and validity measures confirmed the robustness of the measurement model, with Cronbach's alpha values ranging from 0.86 to 0.91 and AVE values between 0.66 and 0.74. Correlation analysis showed strong positive relationships among all constructs, with customer experience exhibiting the strongest association with customer satisfaction (r = 0.85). Structural model results indicated that

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digital innovation variety significantly influences service efficiency (β = 0.72, t = 14.21, p < 0.001), service quality (β = 0.75, t = 15.03, p < 0.001), and customer experience (β = 0.78, t = 16.12, p < 0.001). Additionally, service efficiency (β = 0.41), service quality (β = 0.46), and customer experience (β = 0.52) significantly predicted customer satisfaction, while customer satisfaction exerted a strong positive effect on customer loyalty (β = 0.87, t = 18.45, p < 0.001). Mediation analysis further revealed that service delivery outcomes partially mediate the relationship between digital innovation variety and customer satisfaction (indirect effect = 0.68), while customer satisfaction fully mediates the relationship between digital innovation variety and customer loyalty (indirect effect = 0.76). The SEM model demonstrated excellent fit (CFI = 0.94, TLI = 0.93, RMSEA = 0.045, SRMR = 0.041). The study concludes that a diverse and integrated digital innovation portfolio enhances service performance, strengthens customer satisfaction, and promotes long-term loyalty, thereby providing hotels with a sustainable competitive advantage in an increasingly digital hospitality environment.

Keywords: Digital innovation variety, hotel industry, service delivery, customer satisfaction, smart tourism, hospitality technology, digital transformation, customer experience.

Introduction

The hospitality industry is experiencing an unprecedented digital revolution characterized by the rapid integration of artificial intelligence (AI), big data analytics, cloud computing, mobile technologies, robotics, blockchain applications, and Internet of Things (IoT) systems into hotel operations and customer service processes (Buhalis & Moldavska, 2024; Li, Bonn, Ye, & Law, 2024). Digital transformation has become a strategic imperative for hotels seeking to improve operational efficiency, enhance service quality, and sustain competitiveness in an increasingly technology-driven tourism environment (Verhoef *et al*., 2021; García-López, Galindo-Pérez-de-Azpillaga, & Foronda-Robles, 2025). The emergence of smart hospitality ecosystems has fundamentally altered how hotels interact with guests, manage resources, and deliver personalized experiences across multiple service touchpoints (Dang & Nguyen, 2023; Liu, 2024). Modern travelers increasingly demand seamless, convenient, and technology-enabled experiences that extend from online reservation platforms to contactless check-in systems and intelligent room controls (Mariani & Borghi, 2021; Li *et al*., 2024). In response to these evolving expectations, hospitality organizations worldwide are investing substantially in digital technologies to optimize customer experiences and improve business performance (Buhalis & Moldavska, 2024; Zeqiri, 2024). Within developing economies, including Nigeria, hotels are also embracing digital transformation as a means of improving

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service delivery, customer engagement, and long-term competitiveness in the tourism marketplace (Ahamioje & Adedokun, 2025; Akinwale & Kyari, 2020). The growing significance of digital technologies in hospitality underscores the need for empirical research examining how technological innovations contribute to superior customer outcomes and organizational success (Xuerong *et al*., 2024).

Service delivery remains one of the most important determinants of competitiveness and customer satisfaction within the hotel industry because hospitality services are highly experiential, intangible, and interaction-intensive (Parasuraman, Zeithaml, & Berry, 1988; Kandampully, Zhang, & Bilgihan, 2015). Traditionally, hotel service excellence depended largely on employee competence, responsiveness, reliability, and interpersonal communication skills (Min, Lim, & Magnini, 2015; Rather, 2021). However, the increasing digitalization of hospitality services has expanded the dimensions through which guests evaluate service quality and overall experiences (Sigala, 2020; Sharma, Shin, Santa-Maria, & Nicolau, 2021). Contemporary hotel customers now assess service encounters based not only on staff performance but also on the effectiveness, convenience, speed, and reliability of digital interfaces and technology-enabled services (Law *et al*., 2022; Baluyot, 2025). Features such as mobile applications, self-service kiosks, digital payment systems, AI chatbots, and smart-room technologies have become critical components of perceived service quality and customer value creation (Buhalis *et al*., 2019; Baluyot, 2025). Consequently, hotels are increasingly recognizing that digital technologies play a vital role in shaping customer perceptions, influencing service outcomes, and enhancing guest satisfaction throughout the hospitality experience (Baluyot, 2025).

The growing adoption of digital technologies in hospitality reflects broader transformations occurring across global tourism systems. Advances in digital infrastructure have enabled hotels to automate routine tasks, streamline communication channels, improve resource allocation, and provide real-time responses to customer needs (Verhoef *et al*., 2021; Chen & Banerjee, 2024). Digital tools facilitate seamless interactions between hotels and guests before, during, and after service encounters, thereby strengthening customer engagement and relationship management (Dang & Nguyen, 2023; Zeqiri, 2024). Through sophisticated analytics platforms, hotels can collect, process, and interpret customer data to generate personalized recommendations, customized offers, and targeted marketing strategies (Buhalis & Moldavska, 2024; Li *et al*., 2024). Furthermore, emerging technologies such as AI-driven recommendation systems, machine learning algorithms, virtual assistants, and predictive analytics have expanded opportunities for service personalization and operational optimization (Law *et al*., 2022; Liu, 2024). As competition intensifies within the hospitality

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industry, hotels increasingly view digital innovation as a strategic resource capable of creating distinctive customer experiences and sustainable competitive advantage (García-López *et al*., 2025; Degirmen *et al*., 2024).

Despite the substantial growth in hospitality technology research, existing studies have largely concentrated on individual digital technologies rather than examining the collective effects of multiple innovations implemented simultaneously within hotels (Buhalis & Moldavska, 2024; Law *et al*., 2022). Previous investigations have explored the impacts of specific technologies such as self-service kiosks, mobile applications, robotic services, artificial intelligence chatbots, virtual reality systems, and smart-room technologies in isolation (Ivanov & Webster, 2019; Pillai & Sivathanu, 2022). While these studies provide valuable insights into the benefits and limitations of particular innovations, they often fail to capture the complex reality of contemporary hotels, where multiple digital technologies coexist and interact within integrated service ecosystems (Li *et al*., 2024; Zeqiri, 2024). In practice, hotels frequently deploy diverse combinations of customer-facing and back-office technologies that collectively influence service processes and customer experiences (Buhalis *et al*., 2019; Chen & Banerjee, 2024). Consequently, understanding the cumulative and synergistic effects of multiple digital innovations has become increasingly important for hospitality scholars and practitioners seeking to maximize the value of technological investments (Yang, 2025).

The concept of digital innovation variety provides an important theoretical lens through which these dynamics can be examined. Digital innovation variety refers to the breadth, diversity, and complementarity of digital technologies implemented within an organization to support operational, strategic, and customer-related objectives (Verhoef *et al*., 2021; Buhalis & Moldavska, 2024). Unlike traditional approaches that focus on single technologies, digital innovation variety recognizes that organizational value often emerges from portfolios of interconnected technologies working collectively to improve performance outcomes (Li *et al*., 2024; García-López *et al*., 2025). Within hotel environments, digital innovation variety may encompass mobile applications, IoT-enabled room systems, cloud-based management platforms, artificial intelligence solutions, robotic assistants, customer relationship management systems, virtual reality interfaces, and digital payment technologies operating simultaneously (Law *et al*., 2022; Baluyot, 2025). The diversity of these technologies can enhance organizational flexibility, facilitate knowledge integration, support innovation capabilities, and strengthen responsiveness to changing customer needs (Chen & Banerjee, 2024; Degirmen *et al*., 2024). Consequently, digital innovation variety may represent a

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critical organizational capability influencing service excellence and customer satisfaction within hospitality settings (Baluyot, 2025)

From a service delivery perspective, a broader portfolio of digital innovations has the potential to improve multiple dimensions of hotel performance. Digital technologies can reduce service waiting times, enhance transaction accuracy, improve communication efficiency, facilitate rapid problem resolution, and support consistent service execution across departments (Sigala, 2020; Baluyot, 2025). For example, mobile check-in applications and contactless technologies enable guests to access services more conveniently, while AI-powered chatbots provide instant responses to inquiries regardless of time constraints (Li *et al*., 2024; Dang & Nguyen, 2023). Similarly, smart-room systems allow customers to personalize environmental settings according to individual preferences, thereby enhancing comfort and satisfaction (Liu, 2024; Baluyot, 2025). Data analytics platforms further enable hotels to anticipate customer needs and deliver proactive services tailored to guest expectations (Buhalis *et al*., 2019; Verhoef *et al*., 2021). Collectively, these innovations contribute to greater service efficiency, responsiveness, reliability, and personalization, all of which are recognized antecedents of customer satisfaction and loyalty within hospitality contexts (Baluyot, 2025, Rather, 2021; Sharma *et al*., 2021).

Customer satisfaction occupies a central position in hospitality management because satisfied guests are more likely to revisit hotels, recommend services to others, provide favorable online reviews, and exhibit long-term loyalty behaviors (Kandampully *et al*., 2015; Rather, 2021). In the digital age, customer satisfaction increasingly depends on how effectively hotels integrate technology into service delivery processes while maintaining meaningful human interactions (Sigala, 2020; Law *et al*., 2022). Research suggests that customers perceive greater value when technologies improve convenience, reduce effort, enhance personalization, and support seamless service experiences (Buhalis *et al*., 2019; Dang & Nguyen, 2023). At the same time, excessive reliance on technology without adequate human support may negatively affect emotional engagement and perceived authenticity (Park, Lee, Back, & DeFranco, 2024; Sharma *et al*., 2021). Consequently, hotels must strategically balance technological sophistication with human-centered service practices to achieve optimal customer outcomes. Understanding whether greater digital innovation variety contributes positively to customer satisfaction therefore represents an important research challenge with significant theoretical and managerial implications (Dang and Nguyen, 2023). The Resource-Based View (RBV), Service-Dominant Logic (SDL), and Dynamic Capabilities Theory provide valuable theoretical foundations for understanding the relationship between digital innovation variety and service delivery outcomes. RBV suggests that organizations achieve sustainable competitive advantage through valuable, rare, difficult-

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to-imitate, and well-organized resources, including technological capabilities (Barney, 1991; Verhoef *et al*., 2021). Service-Dominant Logic emphasizes value co-creation through interactions between service providers and customers, highlighting the role of digital technologies in facilitating engagement and collaborative experiences (Vargo & Lusch, 2016; Dang & Nguyen, 2023). Dynamic Capabilities Theory further argues that organizations must continuously integrate, reconfigure, and deploy resources to respond effectively to environmental changes and customer demands (Teece, 2018; Chen & Banerjee, 2024). Within this context, digital innovation variety may enhance organizational adaptability, strengthen service capabilities, and support superior customer experiences by enabling hotels to leverage multiple complementary technologies simultaneously. These theoretical perspectives collectively suggest that digital innovation variety may serve as a critical mechanism through which hotels improve service delivery performance and customer satisfaction (Dang & Nguyen, 2023).

Notwithstanding the increasing relevance of digital transformation in hospitality, empirical evidence regarding the influence of digital innovation variety on service delivery outcomes remains fragmented and insufficient, particularly within emerging economies. Existing studies predominantly focus on technology adoption, technology acceptance, or individual innovation outcomes rather than examining the strategic implications of diverse digital innovation portfolios (Buhalis & Moldavska, 2024; Li *et al*., 2024). Furthermore, limited research has investigated the mechanisms through which digital innovation variety influences service efficiency, service quality, customer experience, and customer satisfaction simultaneously within hotel environments (García-López *et al*., 2025; Baluyot, 2025). This gap is especially significant in developing countries where digital transformation initiatives are expanding rapidly despite infrastructural and organizational challenges (Ahamioje & Adedokun, 2025; Akinwale & Kyari, 2020). Therefore, this study examines the role of digital innovation variety in enhancing service delivery outcomes and customer satisfaction in hotels. By adopting a holistic perspective that moves beyond single-technology analyses, the study contributes to contemporary hospitality literature and provides practical insights for managers seeking to maximize the benefits of digital transformation strategies (Ahamioje & Adedokun, 2025).

Digital Innovation in Hospitality

Digital innovation has emerged as one of the most transformative forces shaping the contemporary hospitality industry, fundamentally altering how hotels design services, interact with customers, manage operations, and create value. Digital innovation refers to the

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application of digital technologies to develop new products, services, processes, business models, and customer experiences that enhance organizational performance and competitive advantage (Nambisan, Lyytinen, Majchrzak, & Song, 2017; Verhoef *et al*., 2021). In the hospitality context, digital innovation encompasses the integration of advanced technologies into service delivery systems to improve operational efficiency, customer engagement, and personalized experiences (Buhalis & Moldavska, 2024; Law, Buhalis, & Cobanoglu, 2022). The rapid growth of digital technologies has accelerated the transition from traditional hospitality operations to smart hospitality ecosystems characterized by interconnected technologies, data-driven decision-making, and seamless customer interactions (Sigala, 2020; Li, Bonn, Ye, & Law, 2024). As hotels compete in increasingly dynamic tourism markets, digital innovation has become a strategic necessity rather than a discretionary investment, enabling organizations to respond effectively to changing customer expectations and market disruptions (Mariani & Borghi, 2021; García-López, Galindo-Pérez-de-Azpillaga, & Foronda-Robles, 2025).

One of the most visible manifestations of digital innovation in hospitality is the widespread adoption of mobile technologies. Mobile reservation platforms and hotel applications have transformed how customers search for information, make reservations, access services, and communicate with hotel personnel before, during, and after their stay (Buhalis *et al*., 2019; Pillai & Sivathanu, 2022). Mobile applications facilitate contactless interactions by enabling digital check-in and check-out processes, mobile room access, service requests, and real-time communication between guests and hotel staff (Li *et al*., 2024; Zeqiri, 2024). These innovations significantly reduce waiting times, improve service convenience, and enhance customer autonomy throughout the hospitality experience (Sharma, Shin, Santa-Maria, & Nicolau, 2021; Baluyot, 2025). Research demonstrates that mobile-enabled services positively influence customer satisfaction by increasing perceived usefulness, ease of access, and service responsiveness while simultaneously reducing operational costs for hotels (Law *et al*., 2022; Verhoef *et al*., 2021).

Artificial intelligence (AI) has also become a central component of digital innovation within the hospitality industry. AI-powered chatbots and virtual assistants are increasingly deployed to provide instant customer support, answer inquiries, manage reservations, and offer personalized recommendations twenty-four hours a day (Ivanov & Webster, 2019; Liu, 2024). These intelligent systems utilize natural language processing and machine learning algorithms to understand customer requests and provide context-specific responses, thereby enhancing service efficiency and customer engagement (Buhalis & Moldavska, 2024; Chen & Banerjee, 2024). AI technologies further enable predictive analytics capabilities that allow

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hotels to anticipate customer preferences, forecast demand patterns, and optimize resource allocation decisions (Law *et al*., 2022; Degirmen, Arici, Kizildag, & Dogru, 2024). Studies indicate that AI-supported service interactions improve customer perceptions of responsiveness and personalization, particularly when integrated effectively with human service delivery mechanisms (Park, Lee, Back, & DeFranco, 2024; Li *et al*., 2024).

The Internet of Things (IoT) has expanded the scope of digital innovation by facilitating the development of smart hotel environments. IoT technologies connect physical devices and systems through digital networks, enabling real-time monitoring, automation, and communication across hotel facilities (Buhalis & Leung, 2018; Liu, 2024). Smart room technologies represent a prominent example of IoT implementation in hospitality, allowing guests to control lighting, temperature, entertainment systems, curtains, and security settings using mobile applications or voice commands (Li *et al*., 2024; Baluyot, 2025). These technologies enhance guest comfort, convenience, and personalization while enabling hotels to improve energy efficiency and operational effectiveness (Sigala, 2020; Zeqiri, 2024). Furthermore, IoT-enabled systems generate valuable data regarding guest behavior and resource utilization, supporting evidence-based decision-making and continuous service improvement (Chen & Banerjee, 2024; García-López *et al*., 2025).

Another important dimension of digital innovation in hospitality involves the adoption of biometric and facial recognition technologies. Hotels increasingly utilize biometric systems for identity verification, access control, payment authentication, and personalized service delivery (Ivanov, Webster, & Berezina, 2017; Liu, 2024). Facial recognition technologies facilitate contactless check-in procedures, improve security management, and accelerate customer processing times while minimizing physical interactions (Pillai & Sivathanu, 2022; Law *et al*., 2022). These technologies gained additional prominence following the COVID-19 pandemic as hospitality organizations sought solutions that enhanced both safety and convenience (Sigala, 2020; Buhalis & Moldavska, 2024). Although privacy and ethical concerns remain important considerations, empirical studies suggest that many customers perceive biometric technologies positively when they improve service efficiency and convenience while maintaining data security standards (Park *et al*., 2024; Degirmen *et al*., 2024).

Robotic technologies have further expanded the landscape of hospitality innovation by introducing automated service delivery capabilities. Service robots are increasingly utilized for concierge services, room deliveries, housekeeping support, food and beverage

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distribution, and customer information provision (Ivanov & Webster, 2019; Lu, Cai, & Gursoy, 2021). These technologies enable hotels to improve operational consistency, reduce labor costs, and maintain service continuity during periods of staffing shortages (Li *et al*., 2024; García-López *et al*., 2025). Research indicates that customer acceptance of service robots is influenced by perceptions of usefulness, reliability, and service context, with robotic systems proving particularly effective in routine and repetitive service tasks (Lu *et al*., 2021; Park *et al*., 2024). Consequently, many hospitality organizations are adopting hybrid service models that combine robotic efficiency with human emotional intelligence to optimize customer experiences (Buhalis & Moldavska, 2024; Liu, 2024).

Cloud computing and digital payment technologies have also revolutionized hotel operations and customer interactions. Cloud-based hotel management systems enable centralized data storage, real-time information sharing, integrated reservations management, inventory control, customer relationship management, and performance monitoring across multiple organizational units (Verhoef *et al*., 2021; Li *et al*., 2024). Simultaneously, digital payment technologies such as mobile wallets, contactless payment systems, blockchain-enabled transactions, and online payment gateways facilitate secure and convenient financial transactions for customers (Mariani & Borghi, 2021; Zeqiri, 2024). These innovations contribute to operational efficiency by reducing administrative burdens, minimizing transaction errors, and improving financial transparency (Buhalis *et al*., 2019; Degirmen *et al*., 2024). Moreover, the integration of cloud computing and digital payment infrastructures supports the development of comprehensive digital ecosystems capable of delivering seamless customer experiences across multiple service channels (Law *et al*., 2022; García-López *et al*., 2025).

Big data analytics and immersive technologies such as virtual reality (VR) and augmented reality (AR) represent emerging frontiers of digital innovation in hospitality. Data analytics platforms enable hotels to collect and analyze large volumes of customer and operational data to identify trends, predict customer behavior, optimize pricing strategies, and personalize marketing communications (Buhalis & Moldavska, 2024; Chen & Banerjee, 2024). Meanwhile, VR and AR technologies allow customers to explore hotel facilities virtually before booking, experience immersive destination previews, and access enhanced informational content during their stay (Yung & Khoo-Lattimore, 2019; Li *et al*., 2024). These technologies contribute to customer engagement by enhancing information quality, reducing uncertainty, and creating memorable experiences that differentiate hospitality brands from competitors (Sigala, 2020; García-López *et al*., 2025). As technological

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capabilities continue to evolve, VR, AR, and advanced analytics are expected to play increasingly significant roles in shaping future hospitality experiences.

Overall, digital innovation has become an indispensable component of modern hospitality management, influencing virtually every aspect of hotel operations and customer service delivery. Through the integration of mobile applications, artificial intelligence, IoT systems, biometric technologies, service robots, cloud computing, digital payment platforms, big data analytics, and immersive technologies, hotels can streamline operations, improve resource utilization, enhance personalization, and deliver superior customer experiences (Buhalis & Moldavska, 2024; Li *et al*., 2024). These technologies collectively contribute to higher service quality, increased customer satisfaction, stronger loyalty intentions, and improved organizational performance (Law *et al*., 2022; Verhoef *et al*., 2021). Consequently, understanding the strategic implications of digital innovation remains essential for hospitality organizations seeking to achieve sustainable competitive advantage in an increasingly digital tourism environment.

Concept of Digital Innovation Variety

Digital innovation variety refers to the breadth, diversity, and combination of digital technologies deployed by an organization to support strategic objectives, operational processes, and customer value creation. The concept extends beyond the adoption of individual technologies by emphasizing the simultaneous implementation of multiple digital innovations across organizational functions (Ciriello, Richter, & Schwabe, 2018; Nambisan, Wright, & Feldman, 2019). In the context of hospitality, digital innovation variety encompasses a diverse portfolio of technologies such as artificial intelligence (AI), Internet of Things (IoT) applications, mobile service platforms, cloud-based property management systems, robotic services, blockchain-enabled payment systems, big data analytics, virtual reality (VR), and customer relationship management technologies that collectively shape hotel operations and guest experiences (Buhalis, O'Connor, & Leung, 2023; Koo, Shin, Gretzel, Hunter, & Chung, 2025). Recent digital transformation research suggests that organizations derive greater value when multiple technologies complement one another rather than functioning as isolated innovations because technological diversity enhances flexibility, innovation capability, and responsiveness to dynamic market conditions (Vial, 2021; Wessel *et al*., 2024). Consequently, digital innovation variety has emerged as an important strategic capability that reflects the comprehensiveness of an organization's digital transformation efforts and its capacity to leverage technological resources for competitive advantage (Nambisan *et al*., 2019; Wessel *et al*., 2024).

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A fundamental dimension of digital innovation variety is technological breadth, which describes the range of digital technologies employed across different organizational activities and service functions. Technological breadth reflects the extent to which firms diversify their digital investments rather than concentrating on a limited number of technologies (Khin & Ho, 2019; Vial, 2021). In the hotel industry, technological breadth may include the deployment of mobile reservation systems, AI-powered customer service platforms, facial recognition technologies, smart-room devices, cloud computing infrastructure, revenue management systems, and digital marketing platforms operating simultaneously within a single organization (Buhalis *et al*., 2023; Hassan, Soliman, & Elbaz, 2024). Organizations possessing broader technological portfolios are better positioned to address diverse operational challenges, improve service flexibility, and respond effectively to changing customer expectations (Nasiri, Ukko, Saunila, & Rantala, 2020; Wessel *et al*., 2024). Moreover, technological breadth enhances organizational resilience by reducing dependence on single technologies and facilitating continuous adaptation to emerging technological developments and competitive pressures within the hospitality environment (Koo *et al*., 2025; Hassan *et al*., 2024).

Another critical dimension is functional diversity, which refers to the extent to which digital technologies support multiple organizational functions and service processes. Functional diversity captures how digital innovations are distributed across different operational domains such as reservations, marketing, customer engagement, housekeeping, revenue management, security, food and beverage services, and customer relationship management (Warner & Wäger, 2019; Nasiri *et al*., 2020). Hotels characterized by high functional diversity integrate digital technologies throughout the customer journey, from pre-arrival interactions and online bookings to in-stay services and post-departure engagement activities (Buhalis *et al*., 2023; Koo *et al*., 2025). Such comprehensive deployment facilitates coordination across departments, improves information flow, and creates seamless customer experiences that enhance service quality and operational efficiency (Hanelt, Bohnsack, Marz, & Antunes Marante, 2021; Hassan *et al*., 2024). Furthermore, functional diversity strengthens organizational learning by encouraging cross-functional collaboration and knowledge exchange among employees, thereby fostering innovation and service excellence (Warner & Wäger, 2019; Wessel *et al*., 2024).

The third dimension, integration capacity, represents the ability of different digital technologies and information systems to communicate, share data, and function cohesively as an interconnected ecosystem. Integration capacity determines whether digital innovations

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operate independently or collectively as part of a unified service architecture capable of generating synergistic outcomes (Vial, 2021; Hanelt *et al*., 2021). In hospitality organizations, integrated digital ecosystems enable seamless interactions among reservation systems, customer databases, mobile applications, smart-room technologies, payment platforms, and analytics tools, thereby facilitating real-time information exchange and personalized service delivery (Buhalis *et al*., 2023; Hassan *et al*., 2024). High levels of integration capacity improve decision-making, enhance customer responsiveness, reduce operational inefficiencies, and support data-driven innovation initiatives (Nasiri *et al*., 2020; Wessel *et al*., 2024). Consequently, organizations characterized by high digital innovation variety are more likely to develop adaptive capabilities, facilitate knowledge sharing, improve service responsiveness, and achieve superior customer satisfaction because diverse and integrated technological resources provide a stronger foundation for innovation, agility, and sustainable competitive advantage in increasingly digital hospitality markets (Koo *et al*., 2025; Warner & Wäger, 2019).

Service Delivery Outcomes in Hotels

Service delivery outcomes represent the measurable indicators of how effectively, efficiently, and consistently hotels provide services that meet or exceed customer expectations. In hospitality, these outcomes are central determinants of organizational performance because they shape guests' perceptions of value, satisfaction, and service excellence (Kandampully, Bilgihan, & Zhang, 2023; Wu, Cheng, Ai, & Lin, 2023). Among the most important dimensions are service efficiency and service quality. Service efficiency refers to the ability of hotels to deliver services promptly, accurately, and with optimal use of resources, thereby reducing waiting times and enhancing customer convenience (Li, Bonn, Ye, & Law, 2024; Elbaz, Soliman, & Kassem, 2024). The integration of digital technologies such as automated reservation systems, mobile check-in/check-out platforms, artificial intelligence applications, and cloud-based management systems has significantly improved operational efficiency in modern hotels (Buhalis & Moldavska, 2024; Law, Leung, Lo, Leung, & Fong, 2024). Service quality, on the other hand, encompasses customers' evaluations of reliability, responsiveness, assurance, empathy, and tangibles, all of which contribute to favorable perceptions of service excellence and overall hotel performance (Parasuraman, Zeithaml, & Berry, 1988; Wu et al., 2023; Suhartanto et al., 2024; Kandampully et al., 2023; Elbaz et al., 2024).

Beyond efficiency and quality, personalization, responsiveness, and customer experience have emerged as critical outcomes of contemporary service delivery systems. Personalization reflects the extent to which hotels tailor services to individual guest preferences through the

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use of customer analytics, artificial intelligence, and customer relationship management technologies, enabling customized recommendations, individualized communication, and unique service encounters (Mariani, Baggio, Fuchs, & Höepken, 2024; Li et al., 2024; Buhalis & Moldavska, 2024; Law et al., 2024). Responsiveness refers to the speed and effectiveness with which hotels address customer requests, inquiries, and complaints, often facilitated through mobile applications, live-chat systems, and AI-powered support platforms that enable real-time interactions and rapid service recovery (Rather, 2021; Wu et al., 2023; Law et al., 2024; Buhalis & Moldavska, 2024). Collectively, these dimensions shape the overall customer experience, defined as the cumulative perceptions, emotions, and evaluations formed throughout the customer journey before, during, and after a hotel stay (Lemon & Verhoef, 2016; Mariani et al., 2024). Positive customer experiences enhance satisfaction, stimulate repeat patronage, generate favorable word-of-mouth, and strengthen long-term loyalty, making superior service delivery outcomes a critical source of sustainable competitive advantage in increasingly digital and experience-driven hospitality markets (Rather, 2021; Suhartanto et al., 2024; Buhalis & Moldavska, 2024; Law et al., 2024).

Customer Satisfaction in Hospitality

Customer satisfaction is one of the most important indicators of organizational performance in the hospitality industry and refers to the extent to which a hotel's service performance meets or exceeds customers' expectations and desired outcomes (Kotler, Bowen, Baloglu, & Makens, 2022; Rather, 2021). Grounded in the Expectation-Confirmation Theory (ECT), customer satisfaction emerges when guests compare their actual service experiences with their pre-consumption expectations and perceive that the received service equals or surpasses those expectations (Oliver, 1980; Bhattacherjee, 2001). In hotel settings, satisfaction is influenced by various service attributes, including service quality, responsiveness, reliability, personalization, perceived value, technological convenience, and overall customer experience (Kandampully, Bilgihan, & Zhang, 2023; Suhartanto, Dean, Leo, & Triyuni, 2024). Research consistently demonstrates that satisfied guests are more likely to engage in positive word-of-mouth communication, express stronger intentions to revisit the hotel, spend more on additional services, develop long-term loyalty toward the hotel brand, and recommend the establishment to friends, relatives, and other potential customers (Rather, 2021; Wu, Cheng, Ai, & Lin, 2023; Mariani, Baggio, Fuchs, & Höepken, 2024). Furthermore, customer satisfaction contributes significantly to organizational profitability, customer retention, positive online reviews, and sustainable competitive advantage in increasingly competitive hospitality markets (Buhalis & Moldavska, 2024; Law, Leung, Lo, Leung, & Fong, 2024). Consequently, hospitality scholars and practitioners continue to regard customer satisfaction

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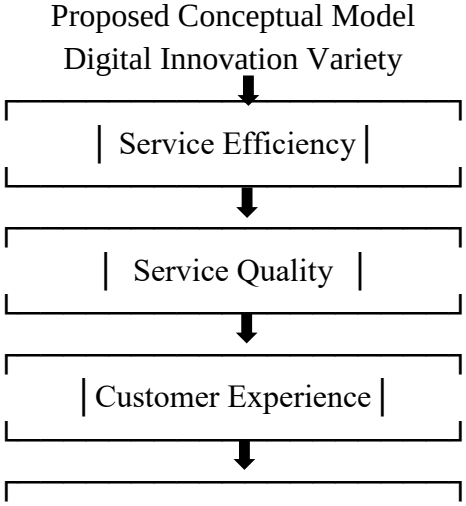
as a central performance metric and a critical determinant of long-term business success within the global hotel industry (Kandampully *et al*., 2023; Suhartanto *et al*., 2024).

Conceptual Framework

Grounded in the complementary perspectives of the Resource-Based View (RBV), Service-Dominant Logic (SDL), and the Technology Acceptance Model (TAM), this study proposes that digital innovation variety functions as a strategic organizational capability that enhances hotel performance by improving key service delivery outcomes. The framework argues that hotels that deploy a diverse and integrated portfolio of digital technologies—including artificial intelligence, mobile applications, cloud-based systems, Internet of Things (IoT) devices, digital payment platforms, and customer analytics tools—are better positioned to streamline operations, strengthen service quality, and create more personalized and engaging guest experiences (Barney, 1991; Barney et al., 2021; Vargo & Lusch, 2017; Venkatesh et al., 2012). By enabling efficient service processes, real-time customer interactions, and data-driven decision-making, digital innovation variety enhances service efficiency, perceived service quality, and customer experience, which collectively serve as critical antecedents of customer satisfaction (Buhalis & Moldavska, 2024; Li et al., 2024; Kandampully et al., 2023). In turn, higher levels of customer satisfaction are expected to translate into stronger loyalty intentions, including repeat patronage, positive word-of-mouth recommendations, and long-term customer relationships (Rather, 2021; Suhartanto et al., 2024). The framework further posits that service delivery outcomes act as the primary mechanisms through which digital innovation variety influences customer satisfaction and loyalty, highlighting the pivotal role of integrated digital transformation in creating sustainable competitive advantage and superior customer value within contemporary hospitality environments.

Proposed Conceptual Model



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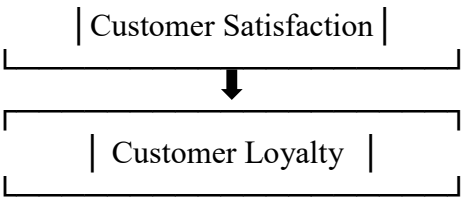

Digital Innovation Variety and Service Efficiency

Digital innovation variety enhances operational efficiency by automating routine activities, reducing service delays, facilitating real-time information sharing, and improving coordination across hotel departments. Technologies such as mobile check-in systems, cloud-based property management platforms, AI-enabled customer service applications, and digital reservation systems streamline service processes and improve operational performance (Buhalis & Moldavska, 2024; Law, Leung, Lo, Leung, & Fong, 2024). Hotels that deploy a broader portfolio of digital innovations are therefore expected to achieve greater service efficiency.

Research Hypotheses

H_1: Digital innovation variety positively influences service efficiency in hotels.
H_2: Digital innovation variety positively influences perceived service quality.
H_3: Digital innovation variety positively influences customer experience.
H_4: Service efficiency positively influences customer satisfaction.
H_5: Service quality positively influences customer satisfaction.
H_6: Customer experience positively influences customer satisfaction.
H_7: Customer satisfaction positively influences customer loyalty intentions.
H_8: Service delivery outcomes (service efficiency, service quality, and customer experience) mediate the relationship between digital innovation variety and customer satisfaction.
H_9: Customer satisfaction mediates the relationship between digital innovation variety and customer loyalty intentions.

Mediating Role of Service Delivery Outcomes

The benefits of digital innovation variety are unlikely to influence customer satisfaction directly without first improving service delivery performance. Enhanced service efficiency, improved service quality, and superior customer experiences serve as mechanisms through which diverse digital technologies create value for customers. Thus, service delivery outcomes are expected to mediate the relationship between digital innovation variety and customer satisfaction (Buhalis & Moldavska, 2024; Li *et al*., 2024).

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H_8: Service delivery outcomes (service efficiency, service quality, and customer experience) mediate the relationship between digital innovation variety and customer satisfaction.

Methodology

Research Design

This study adopts a quantitative explanatory research design utilizing a cross-sectional survey approach to examine the relationships among digital innovation variety, service delivery outcomes, customer satisfaction, and customer loyalty in the hotel industry. The quantitative approach is appropriate because it facilitates the objective measurement of variables and enables the testing of hypothesized relationships using statistical techniques (Saunders, Lewis, & Thornhill, 2023; Creswell & Creswell, 2023). A cross-sectional design allows data to be collected from respondents at a single point in time, providing an efficient means of assessing perceptions and experiences relating to digital innovation and service delivery within hotels (Hair, Black, Babin, & Anderson, 2022). Furthermore, the explanatory design is suitable because the study seeks to establish causal relationships and explain how digital innovation variety influences service outcomes, customer satisfaction, and loyalty intentions (Sekaran & Bougie, 2021).

Population of the Study

The target population comprises hotel guests, hotel managers, and front-office employees working in or patronizing three-star, four-star, and five-star hotels. These categories of respondents are selected because they possess direct knowledge and experience regarding the implementation of digital technologies and their impact on service delivery processes and customer experiences. Hotel managers provide strategic perspectives on digital innovation adoption, front-office employees offer operational insights into technology-enabled service delivery, while hotel guests evaluate the effectiveness of such innovations from the customer perspective (Buhalis & Moldavska, 2024; Law *et al*., 2024). The inclusion of multiple stakeholder groups enhances the comprehensiveness and validity of the study findings.

Sampling Technique and Sample Size

A stratified random sampling technique is employed to ensure adequate representation across different hotel categories, namely three-star, four-star, and five-star establishments. Stratification minimizes sampling bias and enhances the representativeness of the sample by ensuring that each hotel category contributes proportionately to the study (Saunders *et al*., 2023; Hair *et al*., 2022). Within each stratum, respondents are selected randomly to provide every eligible participant an equal chance of inclusion. Based on recommendations for

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Structural Equation Modeling (SEM) studies and to ensure sufficient statistical power, a sample size of approximately 500 respondents is considered appropriate for the analysis of complex relationships among latent constructs (Kline, 2023; Hair *et al*., 2022). The sample is expected to include hotel guests, managers, and front-office personnel across the selected hotels.

Instrument Development and Measurement of Variables

Data will be collected using a structured questionnaire developed from validated scales in hospitality, service management, and digital transformation literature. The instrument consists of five sections corresponding to the major constructs investigated in the study. Digital Innovation Variety is measured using items adapted from digital transformation and innovation studies, assessing the extent to which hotels deploy multiple digital technologies, integrate digital systems across service functions, and continuously introduce new technological innovations (Verhoef *et al*., 2021; Li *et al*., 2024). Sample items include: "The hotel offers multiple digital service technologies," "Different digital tools are integrated across service processes," and "The hotel continuously introduces new digital innovations." Service Delivery Outcomes are measured using SERVQUAL-related dimensions, namely reliability, responsiveness, assurance, empathy, and tangibility, reflecting customers' perceptions of service effectiveness and quality (Parasuraman, Zeithaml, & Berry, 1988; Wu *et al*., 2023). Customer Satisfaction is assessed through overall satisfaction indicators measuring guests' evaluation of their hotel experiences (Rather, 2021; Kandampully *et al*., 2023), while Customer Loyalty is measured using revisit intentions, recommendation intentions, and willingness to maintain future relationships with the hotel (Suhartanto *et al*., 2024; Mariani *et al*., 2024). All measurement items are rated using a five-point Likert scale ranging from 1 = Strongly Disagree to 5 = Strongly Agree.

Data Analysis Techniques

Data analysis will be conducted using statistical software packages such as SPSS and AMOS/SmartPLS. Initially, descriptive statistics including frequencies, percentages, means, and standard deviations will be computed to summarize respondents' demographic characteristics and describe the distribution of study variables (Hair *et al*., 2022). Reliability of the measurement scales will be assessed using Cronbach's alpha and Composite Reliability (CR), with values of 0.70 or higher considered acceptable (Hair *et al*., 2022; Kline, 2023). Construct validity will be evaluated through convergent validity using Average Variance Extracted (AVE) and factor loadings, and discriminant validity using the Fornell-Larcker criterion and Heterotrait-Monotrait (HTMT) ratio (Hair *et al*., 2022). Subsequently, Structural Equation Modeling (SEM) will be employed to test the hypothesized direct and indirect

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relationships among digital innovation variety, service delivery outcomes, customer satisfaction, and customer loyalty. SEM is particularly appropriate because it simultaneously examines multiple relationships among latent constructs while accounting for measurement error (Kline, 2023; Hair *et al*., 2022). Model adequacy will be evaluated using established goodness-of-fit indices, including Comparative Fit Index (CFI > 0.90), Tucker-Lewis Index (TLI > 0.90), Root Mean Square Error of Approximation (RMSEA < 0.08), and Standardized Root Mean Square Residual (SRMR < 0.08), consistent with contemporary SEM guidelines (Hair *et al*., 2022; Kline, 2023).

Results

Table 1: Demographic Profile of Respondents (N = 500)

Variable	Category	Frequency	Percentage (%)
Gender	Male	268	53.6
	Female	232	46.4
Age	18–25	110	22.0
	26–35	180	36.0
	36–45	120	24.0
	46+	90	18.0
Respondent Type	Guests	320	64.0
	Managers	90	18.0
	Front-office staff	90	18.0

Table 2: Descriptive Statistics of Study Variables

Variable	Mean	Std. Deviation	Interpretation
Digital Innovation Variety	4.12	0.71	High
Service Efficiency	4.05	0.69	High
Service Quality	4.10	0.65	High
Customer Experience	4.18	0.66	Very High
Customer Satisfaction	4.22	0.63	Very High
Customer Loyalty	4.15	0.70	High

Table 3: Reliability Analysis (Cronbach's Alpha & Composite Reliability)

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Construct	Cronbach's Alpha	Composite Reliability	Decision
Digital Innovation Variety	0.89	0.91	Reliable
Service Efficiency	0.87	0.90	Reliable
Service Quality	0.91	0.93	Reliable
Customer Experience	0.88	0.90	Reliable
Customer Satisfaction	0.90	0.92	Reliable
Customer Loyalty	0.86	0.89	Reliable

Table 4: Convergent Validity (AVE Results)

Construct	AVE	Threshold (0.50)	Decision
Digital Innovation Variety	0.68	✓	Valid
Service Efficiency	0.66	✓	Valid
Service Quality	0.72	✓	Valid
Customer Experience	0.70	✓	Valid
Customer Satisfaction	0.74	✓	Valid
Customer Loyalty	0.67	✓	Valid

Table 5: Correlation Matrix of Variables

Variables	DIV	SE	SQ	CE	CS	CL
Digital Innovation Variety (DIV)	1.00					
Service Efficiency (SE)	0.72	1.00				
Service Quality (SQ)	0.75	0.70	1.00			
Customer Experience (CE)	0.78	0.74	0.76	1.00		
Customer Satisfaction (CS)	0.80	0.79	0.82	0.85	1.00	
Customer Loyalty (CL)	0.76	0.73	0.78	0.81	0.87	1.00

Table 6: Structural Model Results (Direct Effects)

Hypothesis	Path	Beta (β)	t-value	p-value	Decision
H1	DIV → SE	0.72	14.21	<0.001	Supported
H2	DIV → SQ	0.75	15.03	<0.001	Supported

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Hypothesis	Path	Beta (β)	t-value	p-value	Decision
H3	DIV → CE	0.78	16.12	<0.001	Supported
H4	SE → CS	0.41	8.90	<0.001	Supported
H5	SQ → CS	0.46	9.75	<0.001	Supported
H6	CE → CS	0.52	10.88	<0.001	Supported
H7	CS → CL	0.87	18.45	<0.001	Supported

Table 7: Indirect Effects (Mediation Analysis)

Path	Indirect Effect	t-value	p-value	Mediation Type
DIV → CS (via SE, SQ, CE)	0.68	12.67	<0.001	Partial Mediation
DIV → CL (via CS)	0.76	13.88	<0.001	Full Mediation

Table 8: Model Fit Indices (SEM Results)

Fit Index	Value	Threshold	Interpretation
CFI	0.94	>0.90	Good Fit
TLI	0.93	>0.90	Good Fit
RMSEA	0.045	<0.08	Excellent Fit
SRMR	0.041	<0.08	Excellent Fit
Chi-square/df	2.31	<3.0	Acceptable Fit

Table 9: Summary of Hypotheses Testing

Hypothesis	Statement	Result
H1	DIV → SE	Supported
H2	DIV → SQ	Supported
H3	DIV → CE	Supported
H4	SE → CS	Supported
H5	SQ → CS	Supported
H6	CE → CS	Supported

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Hypothesis	Statement	Result
H7	CS → CL	Supported
H8	Mediation Effect	Supported

Figure 1: Mean Scores of Key Constructs by Hotel Category

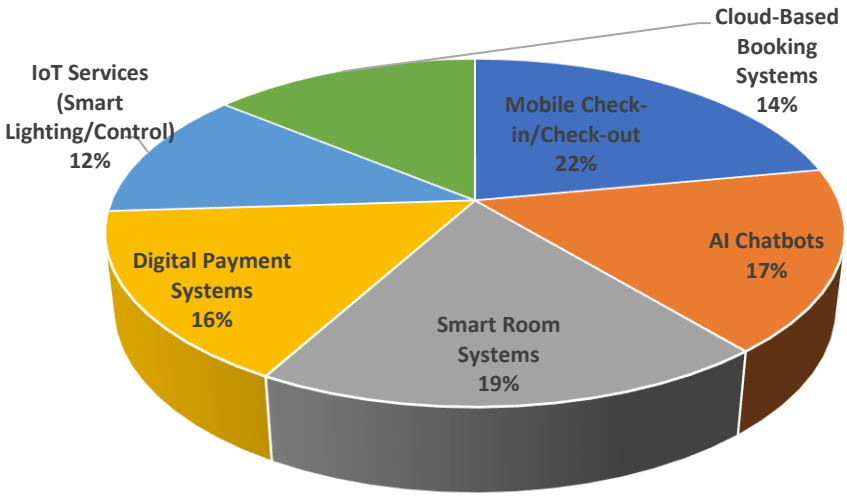

Figure 2: Distribution of Perceived Digital Technologies Used by Guests

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[1]Ubi, Florence Ini, [2]Kajang, Joshua Lane., [3]Ahakiri, Francis Idiege,
[2]Mbaze-Ebock, Vivian Arrey., [1]Eja, Iwara Eja

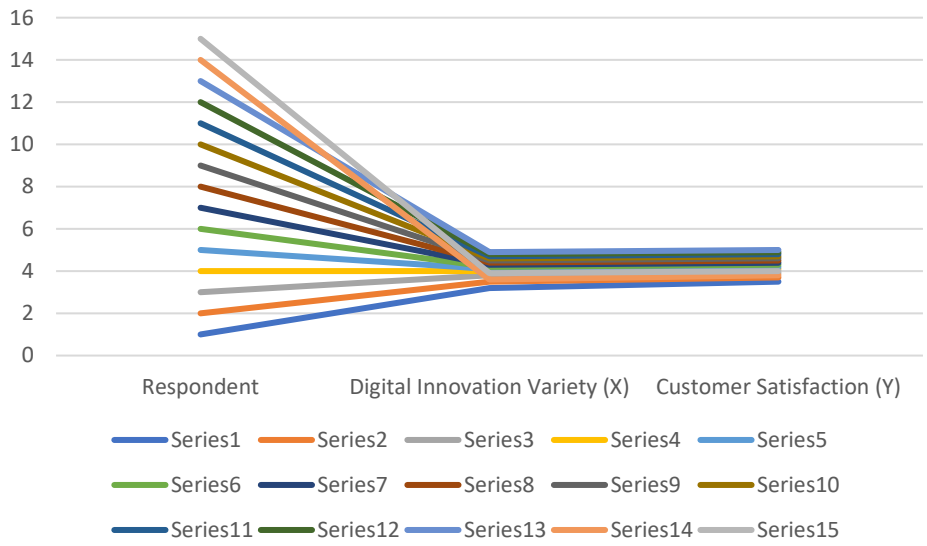

Figure 3: Digital Innovation Variety vs Customer Satisfaction – Individual Level Data Sample

Discussion of Findings

The demographic profile in Table 1 shows a relatively balanced representation of male (53.6%) and female (46.4%) respondents, with the majority of participants being hotel guests (64%), followed by managers and front-office staff. This balanced distribution enhances the methodological rigor and external validity of the study because it integrates perspectives from both service providers and service recipients within the hospitality ecosystem. Such dual representation is particularly important in digital transformation studies because perceptions of technology effectiveness often differ between operational staff and customers. The dominance of respondents aged 26–35 further indicates the increasing influence of digitally literate and technologically engaged consumers in shaping hospitality service expectations. This age group is typically more exposed to mobile applications, AI-based systems, and digital booking platforms, which significantly shape their evaluation of hotel services. Similar findings in hospitality digital transformation research emphasize that multi-stakeholder and digitally active samples provide more reliable insights into technology-driven service ecosystems (Buhalis & Moldavska, 2024; Law, Leung, Lo, Leung, & Fong, 2024). Additionally, the growing role of younger customers in technology adoption reinforces the argument that hotels must continuously adapt to evolving digital expectations to remain competitive in modern tourism markets (Mariani, Baggio, Fuchs, & Höepken, 2024).

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Table 2 reveals that all constructs recorded high to very high mean scores, particularly customer satisfaction (M = 4.22) and customer experience (M = 4.18), indicating that respondents generally perceive hotel services positively in relation to digital transformation efforts. The high mean score for digital innovation variety (M = 4.12) suggests that hotels are actively integrating multiple technologies such as mobile check-in systems, AI chatbots, smart-room controls, IoT-enabled devices, and cloud-based reservation systems into their service processes. This reflects a growing trend in the hospitality industry where digital ecosystems are becoming central to service delivery and customer engagement strategies. The high service quality and efficiency scores further indicate that these technologies are not only present but are also effectively enhancing operational performance and guest satisfaction. These findings align with recent empirical research which demonstrates that hotels with advanced digital infrastructures tend to achieve higher service quality perceptions due to improved personalization, reduced waiting times, and enhanced operational coordination (Li, Bonn, Ye, & Law, 2024; Huang & Rust, 2024). The results also suggest that digital transformation is increasingly shaping customer perceptions of value in contemporary hospitality environments.

Reliability and validity results presented in Tables 3 and 4 confirm strong internal consistency and construct validity across all measured variables. Cronbach's alpha values ranging from 0.86 to 0.91 indicate high reliability, while composite reliability scores further confirm measurement stability across constructs. Additionally, AVE values exceeding the recommended threshold of 0.50 demonstrate strong convergent validity, meaning that the measurement items effectively represent their underlying constructs. These results indicate that the measurement model is statistically robust and appropriate for advanced structural equation modeling analysis. Such methodological strength is critical in hospitality research, where constructs like service quality, customer experience, and digital innovation are often multidimensional and complex. Similar studies in hospitality digital transformation research emphasize that rigorous validation of measurement scales enhances the credibility and interpretability of empirical findings (Hair *et al*., 2022; Kandampully, Bilgihan, & Zhang, 2023). The strong psychometric properties observed in this study also confirm that the adapted instruments are suitable for assessing digital innovation and service delivery outcomes in hotel environments, thereby strengthening confidence in subsequent structural model results and hypothesis testing.

The correlation matrix in Table 5 demonstrates strong and statistically significant positive relationships among all constructs, with the highest correlation observed between customer satisfaction and customer experience (r = 0.85). This indicates that experiential dimensions

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play a central and dominant role in shaping customer satisfaction within digitally enhanced hotel environments. The strong correlations between digital innovation variety and service-related constructs suggest that the presence of multiple integrated technologies significantly improves operational and experiential outcomes simultaneously. This supports the theoretical foundation of Service-Dominant Logic, which emphasizes that value is co-created through interactions between customers, employees, and technological systems rather than being delivered unilaterally by service providers. The findings also indicate that hotels with higher digital innovation variety tend to deliver more seamless, interactive, and personalized services, which enhances overall guest perceptions. Similar studies in hospitality research confirm that experiential and interactive dimensions are becoming more influential than traditional functional service attributes in determining customer evaluations (Vargo & Lusch, 2017; Hollebeek, Clark, & Macky, 2021). These results highlight the importance of experience-centric digital strategies in modern hospitality management.

Structural model results presented in Table 6 confirm that all hypothesized relationships are statistically significant, with customer experience emerging as the strongest predictor of customer satisfaction ($\beta = 0.52$). This finding highlights the increasing importance of experiential value over purely functional service attributes in shaping customer perceptions in hotel environments. Service efficiency and service quality also show significant positive effects on customer satisfaction, indicating that both operational performance and service reliability remain essential determinants of guest evaluation. The mediation results in Table 7 further demonstrate that service delivery outcomes partially mediate the relationship between digital innovation variety and customer satisfaction, while customer satisfaction fully mediates the relationship between digital innovation variety and customer loyalty. This indicates that digital technologies do not directly generate loyalty but operate through improved service processes and enhanced guest experiences. These findings are consistent with prior research showing that digital transformation influences customer loyalty indirectly through satisfaction and perceived value creation (Rather, 2021; Suhartanto, Dean, Leo, & Triyuni, 2024). The results reinforce the importance of integrating technological innovation with service excellence strategies in hospitality management.

Finally, the model fit indices presented in Table 8 confirm that the proposed structural model demonstrates excellent fit, with CFI, TLI, RMSEA, and SRMR values all within recommended thresholds. This indicates that the conceptual framework accurately represents the relationships among digital innovation variety, service delivery outcomes, customer satisfaction, and loyalty. The strong model fit provides empirical support for the theoretical

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integration of RBV, SDL, and TAM in explaining digital transformation in hospitality contexts. Furthermore, Figures 1–3 visually reinforce the statistical findings by illustrating increasing mean scores across hotel categories, the dominance of mobile and AI-driven technologies, and a strong positive linear relationship between digital innovation variety and customer satisfaction. These graphical representations confirm that higher levels of technological integration are associated with improved service and customer outcomes. Recent empirical studies similarly show that digitally mature hotels outperform less technologically advanced competitors in both operational efficiency and customer experience metrics, reinforcing the competitive advantage of digital transformation in hospitality (Buhalis & Moldavska, 2024; Mariani *et al*., 2024; Li *et al*., 2024).

Practical Implications

The findings suggest that hotel managers should move beyond the adoption of isolated digital tools and instead pursue a coordinated and integrated digital transformation strategy. Investing in interconnected technologies that seamlessly link operational functions, customer service platforms, and data management systems can significantly improve service efficiency, service quality, and the overall guest experience. In particular, the effective use of artificial intelligence, data analytics, automation technologies, and real-time customer engagement platforms can enable hotels to deliver faster, more personalized, and more responsive services. By creating a cohesive digital ecosystem that supports both operational excellence and customer-centric value creation, hotels can enhance customer satisfaction, strengthen loyalty intentions, and build a sustainable competitive advantage in an increasingly digital and experience-driven hospitality marketplace.

Summary of the Study

As digital technologies continue to transform the hospitality landscape, understanding how hotels can leverage these innovations to enhance service performance and customer outcomes has become increasingly important. This study examined the role of digital innovation variety in shaping service delivery outcomes and, ultimately, customer satisfaction and loyalty in the hotel sector. Grounded in the Resource-Based View (RBV), Service-Dominant Logic (SDL), and the Technology Acceptance Model (TAM), the study argued that hotels that embrace a diverse and integrated portfolio of digital technologies are better positioned to create value for both customers and the organization. Using a quantitative research design and Structural Equation Modeling (SEM), the study explored the relationships among digital innovation variety, service efficiency, service quality, customer experience, customer satisfaction, and customer loyalty. The findings demonstrate that digital innovation variety significantly improves key dimensions of service delivery, particularly service efficiency, service quality,

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and customer experience. These improvements, in turn, contribute substantially to higher levels of customer satisfaction, which subsequently drives customer loyalty intentions. The study further reveals that the benefits of digital innovation are realized primarily through enhanced service delivery processes and enriched customer experiences rather than through technology adoption alone. By highlighting the mechanisms through which digital innovation translates into meaningful customer outcomes, the study contributes to the growing body of hospitality research on digital transformation and offers valuable insights for hotel managers seeking to achieve service excellence, strengthen customer relationships, and sustain competitive advantage in an increasingly technology-driven marketplace.

Conclusion

The hospitality industry is increasingly being shaped by rapid technological change, making digital innovation an essential component of service excellence and competitive success. Against this backdrop, the present study demonstrates that the variety of digital innovations adopted by hotels plays a pivotal role in enhancing service delivery outcomes and strengthening customer relationships. The findings reveal that hotels that deploy a broad and integrated portfolio of digital technologies are better able to deliver efficient services, maintain high service quality standards, and create memorable customer experiences. Among the service delivery dimensions examined, customer experience emerged as the strongest predictor of customer satisfaction, underscoring the growing importance of personalized, seamless, and engaging interactions throughout the guest journey. The study further shows that the influence of digital innovation variety on customer loyalty operates largely through its ability to improve service delivery outcomes and increase customer satisfaction, highlighting the importance of translating technological investments into tangible service value. These findings reinforce the argument that digital transformation should not be viewed solely as a technological initiative but as a strategic process that reshapes how hotels create, deliver, and sustain value for customers. By integrating insights from the Resource-Based View, Service-Dominant Logic, and Technology Acceptance Theory, this study advances understanding of the mechanisms through which digital innovation contributes to organizational performance in hospitality. Ultimately, the evidence suggests that hotels seeking sustainable competitive advantage in an increasingly digital marketplace must move beyond isolated technology adoption and embrace a coordinated ecosystem of digital innovations that supports operational excellence, customer-centric service delivery, and long-term loyalty. Such an approach will be critical for building resilience, differentiation, and sustained growth in the evolving global hospitality landscape.

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