



Technology Adoption and Service Delivery in Pakistan’s Hospitality and Tourism Sector

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ABSTRACT

The adoption of technologies has emerged to be a critical strategy requirement within Pakistan hospitality and tourism industry due to the factors of competition, changing consumer demands and global digitalization that are transforming the way services are delivered. This article explores the trends and factors of technology adoption in hospitality and tourism companies in Pakistan, in terms of improved service delivery and efficiencies in operations as well as customer experience outcomes. The study will incorporate theoretical views like the Technology Acceptance Model (TAM) and diffusion of innovations to synthesize existing empirical data and industry publications in mapping present technological trends, obstacles, and opportunities in the hotel, tour operators, and digital service platforms. Quantitative analyses and qualitative studies such as TAM application and empirical studies of smart tourism technologies indicate the perceived usefulness, ease of use, infrastructure preparedness, and cultural considerations were found to be important factors that determine adoption. The results indicate that the key elements in enhancing service delivery and competitiveness are digital marketing, mobile platform, online booking and smart service technologies. In addition, the article provides policy and managerial implications to hasten the digital transformation in the ecosystem of tourism in Pakistan. These findings enlighten the stakeholders about the best practices that can be implemented to improve service innovation and adoption of technologies in the hospitality and tourism sectors.

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Introduction

The hospitality and tourism industry is well known to be one of the main drivers in the economic growth, job creation and cultural exchange, especially in the developing economies. The last 20 years have seen speedy changes in digital technologies that have radically altered the organization, operations, and mechanisms of service delivery in this sector across the globe (Buhalis and Law, 2008; Sigala, 2018). The design, delivery, and consumption of tourism services have been redefined through information and communication technologies (ICT), mobile applications, artificial intelligence (AI) and digital platforms, allowing firms to increase their operational efficiency, make customer experiences more personalized, and enhance the quality of the services provided (Gretzel et al., 2015; Law, Buhalis, and Cobanoglu, 2014). Technology adoption in this changing world is now strategic and not an optional innovation by hospitality and tourism businesses.

Service delivery is a fundamental competitiveness factor in the hospitality and tourism industry given that customer experiences are greatly influenced by service encounters, service responsiveness and perceived value (Parasuraman, Zeithaml, and Berry, 1988; Kandampelly, Zhang, and Bilgihan, 2015). Digital technologies applied in the service delivery processes enable organizations to simplify their services, minimize the failures in their services, and be more responsive to the needs of their customers (Bilgihan, Okumus, Nusair, and Kwun, 2011). Online reservation systems, mobile check-in options, digital payments solutions, and customer relationship management (CRM) systems and technologies have become the major focus of modern hospitality operations because they allow firms to provide faster, more precise, and personalized services (Morosan and DeFranco, 2016).

The tourism business has faced a serious move to digitalization worldwide due to the evolving consumer behavior, the rise of internet penetration, and the popularity of smartphone usage (Xiang, Magnini, and Fesenmaier, 2015). The growing need of tourists to use digital platforms to search information, book, pay, and provide feedback after traveling has added pressure on hospitality firms to implement systems to deliver services through technology (Leung, Law, van Hoof, and Buhalis, 2013). This has made the adoption of technology to be also related directly to customer satisfaction, loyalty, and destination competitiveness (Neuhofer, Buhalis, and Ladkin, 2015).

In the developing countries, though, the hospitality and tourism sector is experiencing distinct challenges and opportunities as a result of the introduction of digital technologies. The diffusion of innovation is often hindered by limited infrastructure, financial implications, skills shortages, and organizational resistance even with the possible advantages of the technology-based delivery of services (Rogers, 2003; Zhu, Kraemer, and Xu, 2006). Pakistan is one of the contexts that are of a particular interest to analyze these dynamics. Pakistan has a great potential in state economic development through tourism due to its diversity in culture and natural beauty, as well as booming investments in its domestic tourism sector (Khan, Rasheed, and Zaman, 2020). However, the industry is still characterized by structural inefficiency, poor service delivery, and weak technological adoption especially among small to medium-sized businesses (SMEs).

In the last ten years, there have been significant digital infrastructure gains in Pakistan, such as the growth of broadband access, the usage of smartphones, and mobile payments (State Bank of Pakistan, 2023). The developments have provided hospitality and tourism businesses with fresh opportunities to embrace digital solutions like online booking systems, social media marketing, mobile wallets, and customer engagement systems based on available data. Even with these developments, the adoption of technology is still disproportionate in the

sector, and several companies continue to use the conventional, manual way of delivering services (Ahmed, Khan, and Khan, 2021). This biased implementation poses significant issues about the criteria that affect the use of technology and its real effect on the performance of service delivery.

Theory of technology adoption is an insightful theory that offers good guidelines on the way people and organizations can make decisions that help them accept and utilize new technologies. Technology Acceptance Model (TAM) that was advanced by Davis (1989) assumes that the main predictors of technology acceptance are perceived ease of use and perceived usefulness. TAM has been widely used in hospitality and tourism studies to investigate the use of online booking system, mobile applications, and self-service technologies (Morosan and Jeong, 2008; Amaro and Duarte, 2015). As empirical studies show, the perception about technology as useful and easy to utilize makes the user more likely to adopt technology.

In addition to TAM, Unified Theory of Acceptance and Use of Technology (UTAUT) is a more recent theory that expands the knowledge base by including other elements like social influence and facilitating conditions (Venkatesh, Morris, Davis, and Davis, 2003). These frameworks apply especially in the emerging economies where organizational support, infrastructure preparedness and cultural norms are key determinants in influencing the adoption behavior (Dwivedi et al., 2019). The attitudes of managers, employee capabilities and the willingness of customers in the hospitality industry of Pakistan can play a major role in determining the ways in which technology is incorporated in service delivery.

According to empirical evidence available in the literature of hospitality and tourism, the adoption of technology has a positive impact on the quality of services, operational performance, and customer satisfaction. Research shows that digital technologies improve service delivery time, enhances the coordination of departments and creates the option of real-time communication with customers (Ip, Leung, and Law, 2012; Kim, Lee, and Law, 2008). Also, by utilizing data analytics and CRM tools, companies can more effectively get to know the preferences of the customers and provide them with the services they prefer in order to increase customer perceived value and increase customer visits (Sigala, 2018).

The COVID-19 pandemic further increased the rate of technology integration into the hospitality and the tourism sector as companies were compelled to adopt contactless services, digital payments, as well as online communication tools to keep operations going and ensure their safety amid the pandemic (Gossling, Scott, and Hall, 2021). This change has forever changed the expectations of service delivery, and the use of digital solutions is part of the post-pandemic hospitality operation. In the case of Pakistan, this change is a challenge and opportunity to reform service delivery systems and conform to best practices in the world.

Although there is an increasing literature on the adoption of technology in hospitality and tourism at the international scale, there is limited empirical evidence that specifically examines the adoption technology in Pakistan. There is limited literature that entails extensive discussion on the relationship between technology adoption and service delivery performance at the organizational level and much has focused on marketing or customer perspectives. In addition, empirical studies of the hospitality companies of adoption of technology in city-specific situations are lacking.

To fill this gap, the current paper looks at the adoption of technology and how it affects service delivery within the hospitality and tourism industry in Pakistan, and more specifically those businesses in Lahore. Lahore is a large tourism and business centre, which has a variety of hotels, travel agencies and tour operators catering to both local and foreigners.

Researching the adoption patterns, service outcomes, and the organizational factors in the given context, the study will contribute empirical evidence regarding the impact of digital technologies on the service delivery performance in the context of an emerging market.

So, this study will make three essential contributions to the literature of hospitality and tourism. To begin with, it builds on the technology adoption theory by empirically testing the connection between digital adoption and service delivery performance in a developing country setting. Second, it offers feasible suggestions to hospitality managers who need to improve the quality of services with the integration of technology. Third, it provides evidence policy-related to facilitate digital transformation processes in the tourism industry in Pakistan.

Literature Review

Hospitality and Tourism The adoption of technology

The use of technology in the hospitality and tourism industry has also been a topic that has been given continuous academic attention since it has revolutionary effects on service delivery, operational efficiency, and customer experience. According to the initial research, the value chains of tourism are radically changed by information and communication technologies (ICT) that allow quicker exchange of information, increase the market scope, and improve the coordination between service providers (Buhalis, 2003; Buhalis and Law, 2008). Since as a type of services, tourism is highly information-driven, the digital technologies are placed in the centre of serving reservation, destination marketing, consumer interaction, and post-consumption feedback (Law et al., 2014).

It has been argued that diffusion of digital technologies in hospitality organizations has been elaborated in the adoption theory of innovation with a significant emphasis on relative advantage, compatibility, complexity, trialability and observability as well as drivers of innovation adoption (Rogers, 2003). Empirical studies indicate that hospitality organizations implement technologies when they see definite benefits in their operations, including cost of transaction minimized, increased speed in service delivery, and increased customer satisfaction (Zhu et al., 2006). Nonetheless, not all regions or firms of all sizes are equally adopted, and small and medium enterprises (SMEs) tend to be at the trail end of the large hotel chains because of limited resources (financial and skills) (Thong, 1999; Thomas, Shaw, and Page, 2011).

Hospitality Research Technology Acceptance Models

Technology Acceptance Model (TAM) has become one of the most popular models of studying the issue of technology adoption in hospitality and tourism. TAM is proposed by Davis (1989), it postulates that the attitude and intention to use new technologies depends on perceived usefulness and perceived ease of use. TAM has been proven to be valid in tourism contexts, such as online booking platforms, mobile travel apps, and self-service technologies (Morosan and Jeong, 2008; Amaro and Duarte, 2015).

The studies that implemented TAM in hotel settings prove that employees and customers tend to embrace technology more when it improves efficiency and minimizes effort in service (Kim et al., 2008; Bilgihan et al., 2011). As an example, the perceived usefulness is important in relation to the adoption of mobile check-in systems, whereas ease of use determines customer satisfaction and intention to continue usage (Morosan and DeFranco, 2016). These results indicate that the adoption of technology in hospitality is not only a technical process but also a behavioral process that is influenced by the perception of users.

The Unified Theory of Acceptance and Use of Technology (UTAUT), which is an extension of the TAM, includes the social influence and the facilitating conditions as further predictors of the adoption behaviour (Venkatesh et al., 2003). Research on the use of UTAUT in tourism demonstrates that organizational support, peer pressure, and the availability of infrastructure influence the use of technology, especially in developing nations (Dwivedi et al., 2019; Oliveira et al., 2016). The models are specifically applicable to the hospitality industry in Pakistan, in which the organizational preparedness and external support systems are diverse.

Service delivery performance and Digital Technologies

The implementation of digital technologies into the work of a hospitality facility has a powerful effect on service delivery performance. The previous research findings states that service quality, responsiveness, reliability, and personalization are the main dimensions of service delivery (Parasuraman et al., 1988; Kandampelly et al., 2015). The digital technologies can help firms enhance these dimensions through automating repetitive processes, minimizing human error, and granting companies real-time communication with consumers (Ip et al., 2012).

The most common technological use in the hospitality industry is online reservation systems and property management systems (PMS). It has been shown that these systems enhance the level of room occupancy, minimize overbooking, and also enhance the front-office and the back-office operations (Law and Jogaratnam, 2005; Kim et al., 2008). Likewise, the CRM systems make it easy to deliver personalized services, as it allows the firms to capture and study the customer data, which results in enhanced satisfaction and loyalty (Sigala, 2018).

Mobile technologies have continued to revolutionize the service delivery process by enabling the customers to communicate with the service providers prior, during and after they have travelled. Research indicates the benefits of mobile applications in terms of convenience, speed and perceived control, positively affecting customer satisfaction and intentions to return (Wang, Xiang, and Fesenmaier, 2016; Lu et al., 2015). The technologies come in handy especially in tourist centers in urban areas where clients require digital connections without any hassles.

The Smart Innovation and Technologies in Tourism

Smart tourism has become one of the central ideas as innovative technologies including big data analytics, artificial intelligence (AI), and the Internet of Things (IoT) have been introduced into the tourism system (Gretzel et al., 2015). The use of smart tourism technologies also allows the gathering of data in real-time, making predictions, and providing individual services to the customers, which leads to the increased efficiency of operations and makes the experience more enjoyable (Neuhofer et al., 2015).

Empirical research indicates that AI-driven chatbots, recommendation algorithms, and dynamic pricing assistants significantly enhance the responsiveness of the services and customer interaction (Ivanov and Webster, 2019; Tussyadiah, 2020). Nevertheless, the use of these sophisticated technologies is rather low in developing economies because it is expensive to adopt them, and there is a lack of skills and resistance from organisations (Sigala, 2018). The smart tourism programs in Pakistan are hosted in the initial phase, and most of the hospitality companies are oriented on simple digital technologies instead of sophisticated analytics or automation.

The literature on innovation insists that adoption of technology has to be facilitated by the organizational culture and the managerial dedication in order to realize long-term service

enhancements (Ottenbacher and Harrington, 2007). Companies that consider technology use to match service innovation strategies have higher chances of attaining long term competitive advantages (Hjalager, 2010).

Online Marketing and Customer Retention

ICTs in marketing have taken center stage in service delivery and customer response in hospitality and tourism. Online travel agencies (OTA), social media channels, and review websites also have a considerable impact on the process of decision-making amid the tourists (Xiang and Gretzel, 2010; Leung et al., 2013). It has been found out that efficient application of digital marketing will result in better brand recognition, customer confidence, and transparency of the services (Hudson and Thal, 2013).

Online reviews and social media activities are key factors that hospitality firms that proactively engage in these activities are more likely to experience increased customer satisfaction and perceived quality of service (Sparks and Browning, 2011; Vermeulen and Seegers, 2009). Digital marketing helps the SMEs in developing markets to compete with the larger business by accessing a broader market and creating online presence (Thomas et al., 2011).

Technology Adoption in Emerging and Developing Economies

The adoption of technology in developing countries is different than the situation experienced in developed economies. Diffusion of digital technologies is usually impeded by infrastructure constraints, shortage of skilled workers, financial, and regulatory constraints (Zhu et al., 2006; Kurnie et al., 2015). Research on the emerging markets points out that situational factors like cultural norms, trust and institutional backing, have a significant effect on the adoption results (Dwivedi et al., 2019).

South Asian studies indicate that most hospitality companies do not strategically use technology, but are pressured by their customers to implement an adequate technology that promotes efficiency in their operations instead of long-term innovation objectives (Khan et al., 2020). Pakistani research also shows that the level of awareness of digital tools is getting higher, but the integration into service delivery is not successful because of the absence of training and the uneven management support (Ahmed et al., 2021).

Research Gaps

Though literature worldwide substantiates on the advantages of technology adoption in the hospitality and tourism industry a number of gaps exist. To begin with, there are few empirical research studies on Pakistan specifically those that have examined technology adoption as a direct relationship to firm level service delivery performance. Second, not many studies take a city-specific approach where realities of operations in the locality are taken into account. Third, the research done by others tends to focus on how the customers feel about a product instead of the results that an organization will achieve.

To fill these gaps, this research paper discusses the impact of technology adoption to service delivery performance within the hotel and tourist industry in Lahore, based on which the paper provides context-specific empirical results of a developing economy.

Methodology

Research Design

The research design chosen in this study is quantitative research design in order to investigate how adoption of technology has affected service delivery in the Pakistani hospitality and tourism industry. The authors used a cross-sectional survey method to gather information about hospitality businesses in one of the major urban centres of Pakistan that is also very popular in terms of tourism Lahore. The quantitative design will help to quantify the relational aspects between technology adoption, the efficiency of operations, and the customer satisfaction and statistically analyze the correlations and causal relationships (Creswell, 2025; El Archi and Benbba, 2023). This methodology is more objective, replicable, and empirically validated to hypothesize effects and is based on such frameworks like the Technology Acceptance Model (TAM) and Unified Theory of Acceptance and Use of Technology (UTAUT).

Population and Sample

The target population will be hotels, travel agencies, and tour operators in Lahore. In order to make the process practical, convenience sampling method was adopted, so that, only enterprises willing to participate and with easy accessibility in the city were chosen. This method enabled the researcher to amicably collect primary data of firms that already adopted or were in the stages of adopting digital technologies, including online booking systems, mobile applications, digital payments, and AI-facilitated customer service tools. One hundred and fifty enterprises were chosen to take part in the research, which was a representative sample of different sizes of the firms, types of services, and the level of managerial experience.

Data Collection Methods

The structured questionnaires were used to gather data on such issues as technology adoption, the performance of service delivery, operational efficiency, and customer satisfaction. The questionnaire contained Likert-scaled questions and closed questions which were modified versions of validated scales in previous research of hospitality technology (Hasni, Farah, and Adeel, 2021; Nawaz and Iqbal, 2025). Furthermore, 15 managers were semi-structured interviewed to provide qualitative information on the difficulties of the adoption, benefits of technology, and decision-making. Enterprise size, number of employees, and service volume are the types of secondary data that were gathered in the hotel registries and tourism reports to triangulate the findings and increase the reliability.

Variables and Measures

Technology adoption is an independent variable, which is operationalized as the degree and nature of introduced digital solutions, such as online booking systems, AI-based service tools, mobile apps, and digital payment solutions. The dependent variable is the performance of service delivery that is operational efficiency, service quality and customer satisfaction. Some of the secondary dependent indicators are average response time, rate of response to complaints and the efficiency of the employees. The control variables were firm size, type of services, and managerial experience in order to take into consideration contextual factors that affect both adoption and performance results (Nawaz and Iqbal, 2025; Rasheed et al., 2023).

Table 1: Measurement of Variables

Variable Type	Variable Name	Measurement / Definition
Independent Variable	Technology Adoption	Measured via type of technology implemented, frequency of use, and duration of adoption
Dependent Variable	Service Delivery Performance	Measured through customer satisfaction scores, operational efficiency, and service quality indicators
Dependent Variable	Operational Efficiency	Reduction in service processing time, improved staff utilization
Dependent Variable	Customer Satisfaction	Survey ratings on 5-point Likert scale for service quality, responsiveness, and digital experience
Control Variable	Firm Size	Number of employees or revenue scale for agencies
Control Variable	Service Type	Classification (hotel, travel agency, tour operator)
Control Variable	Managerial Experience	Years of managerial experience influencing adoption decisions

Data Analysis Techniques

Data were analyzed using descriptive statistics, correlation analysis, and structural equation modeling (SEM). Descriptive statistics summarized firm demographics, technology adoption levels, and service delivery performance. Pearson correlation analysis explored relationships between technology adoption and service outcomes, while SEM assessed complex interactions among variables, including mediating effects of operational efficiency on customer satisfaction. Cronbach’s alpha was computed to verify internal consistency of survey scales. Analyses were conducted using SPSS and AMOS software to ensure rigorous statistical evaluation (Creswell, 2025; Nawaz & Iqbal, 2025).

Ethical Considerations

Ethical protocols were followed throughout data collection. Participants were informed about the study’s purpose, assured confidentiality, and provided **voluntary consent**. Data were anonymized to protect the identities of both respondents and enterprises, and fieldwork was conducted with minimal disruption to business operations (Creswell, 2025; Aman, 2025).

Limitations

While focusing on Lahore provides detailed insights, the results may not be generalizable to smaller cities or rural tourism enterprises. Additionally, reliance on convenience sampling may introduce selection bias, although triangulation with secondary data mitigates some of these concerns. Self-reported data may also be subject to social desirability bias, but combining survey, interview, and secondary metrics strengthens validity.

Data Analysis and Findings

Descriptive Analysis

The descriptive analysis generalizes the properties of the 150 hospitality and tourism enterprises that were surveyed in Lahore. Out of the firms involved, 60 percent were hotels, 25 percent travel agencies and 15 percent tour operators. Concerning the size of firms, 65% of businesses had less than 50 employees, 25% had 50-100 employees, and 10% were large scale enterprises that had in excess of 100 employees. Experience in management was also diversified: 38% had experience that was below 5 years, 37% had experience between 5 and

10 years, and 25% had over 10 years experience. There was also a difference in experience of technology adoption with 22% of firms adopting digital solutions less than 1 year of implementation, 52% of firms had an implementation of 1-3 years, and 26% of firms had an implementation of over 3 years.

Descriptive statistics of the important firm characteristics and levels of adoption of technology are shown by Table 1.

Table 2: Demographic Profile of Respondents

Variable	Frequency	Percentage (%)
Firm Type		
Hotel	90	60
Travel Agency	38	25
Tour Operator	22	15
Firm Size (Employees)		
<50	97	65
50–100	38	25
>100	15	10
Managerial Experience (Years)		
<5	57	38
5–10	56	37
>10	37	25
Technology Adoption Duration		
<1 year	33	22
1–3 years	78	52
>3 years	39	26

The statistics show that the majority of businesses are the small to medium-sized ones having an average level of exposure to the technology implementation. The distribution offers a significant base on which the effects of digital technologies on the results of service delivery can be assessed.

Correlation Analysis

The correlation analysis was conducted through Pearson correlation analysis of the relationship between technology adoption and the performance of service delivery. Findings have shown that there is a high level of correlation between the degree of technology adoption and the overall service performance ($r = 0.61$, $p < 0.01$). There was also a positive correlation between the adoption of technology and operational efficiency and customer satisfaction with coefficients of $r = 0.57$ ($p < 0.01$) and $r = 0.59$ ($p < 0.01$) respectively. This indicates that businesses that use digital technology in the form of online reservation systems, mobile apps, and AI-powered customer services attain greater efficiency and better customer experience (Nawaz and Iqbal, 2025; Rasheed et al., 2023).

Service Delivery Performance Analysis

Adoption of technology improved performance on operations and services greatly. Hotels that adopted online booking and AI-based check-in services decreased the average wait time of the guests by 14 minutes in traditional operations to 6-8 minutes after adoption. Travel agencies that made use of the CRM systems realized a 22 percent decrease in the response time to the customer enquiries. Itinerary management with mobile apps used by tour operators was said to have enhanced coordination and reduced services errors.

Table 2: Results of service delivery performance at various levels of technology adoption

Technology Adoption Level	Operational Efficiency Score (Mean ± SD)	Customer Satisfaction Score (Mean ± SD)
Low (<1 year)	3.1 ± 0.5	3.4 ± 0.6
Medium (1–3 years)	3.7 ± 0.4	3.9 ± 0.5
High (>3 years)	4.2 ± 0.3	4.4 ± 0.3

This table shows that businesses that take longer to adopt and have a higher integration rate always have a high level of operational efficiency and customer satisfaction.

Findings of Structural Equation Modeling (SEM)

Structural equation modeling was performed with an aim to investigate causal relationships between technology adoption and operational efficiency on the one hand and customer satisfaction on the other hand. The SEM findings attested that the adoption of technology has a positive effect on service delivery performance ($\beta = 0.61$, $p < 0.001$). It was discovered that the relationship between technology adoption and customer satisfaction was mediated by operational efficiency ($\beta = 0.56$, $p < 0.001$), which shows that one of the most important processes that affect technology positively is the internal process. Other control variables like the size of the firm, the type of service and the managerial experience showed moderating effects yet technology adoption was the main influencing variable in enhancing performance.

These results confirm the hypothesis that the use of technology improves the performance of service delivery, and focus on managerial expertise and the resources of firms to maximize the use of technology (Ukpabi and Karjaluoto, 2016; Nawaz and Iqbal, 2025).

Findings

The findings reveal that digital technologies can contribute to service delivery at the hospitality and tourism industry in Lahore tremendously. The adoption of technology enhances the efficiency of operations by minimizing delays in service delivery and simplification of operations. This, subsequently, increases customer satisfaction and service quality perceived. The SEM results and the positive association of technology adoption prove that the intensity as well as the duration of technology adoption is a key to service performance improvement. The more established and more embracing the enterprises the better it is to the point that the cumulative benefits of integrating technology are shown. These results are consistent with international research that has identified the revolutionary nature of digital solutions in improving the delivery of hospitality services and competitiveness (Rasheed et al., 2023; Aman, 2025; Nawaz and Iqbal, 2025).

Discussion

The results of this paper highlight the importance of the implementation of technology on the performance of service delivery at the hospitality and tourism industry of Lahore. Businesses that adopted digital solutions, including the online booking system, mobile apps, and AI-powered service applications, were more efficient in their operations, responded more quickly, and were more satisfied with their customers. Through the correlation analysis and SEM analysis, it has been revealed that technology adoption is the main factor behind the performance improvements, with operational efficiency mediation on the impact on customer satisfaction. Secondly, the strength and duration of adoption was also significant; the longer the firm has been using technology the more successful was the result indicating that familiarity and integration of systems improves effectiveness. Such findings are consistent

with the previous research in the emerging market, which highlights the fact that digital technologies not only simplify the internal processes but also enhance customer experiences, which contribute to the competitive edge in the most customer-focused industries (Nawaz and Iqbal, 2025; Rasheed et al., 2023; Aman, 2025). In addition, the research paper also emphasizes on managerial skills, firm resources and strategic investment in ICT infrastructure as the key facilitators to maximising the benefits of technology adoption. In general, the discussion demonstrates that digital transformation in hospitality is both a technological and organizational process, which needs to be coordinated between the human, technical, and procedural resources to render sustainable improvements in service.

Conclusion

This paper will come to the conclusion that technology adoption is an essential mechanism of improving the performance of service delivery within the hospitality and tourism industry in Lahore. The businesses that adopted the use of digital tools have reported the quantifiable enhancement of the operational efficiency, customer satisfaction, and the quality of the services. In particular, hotels, travel agencies, and tour operators that implemented online booking, AI-enabled check-in, CRM software, and mobile applications recorded acceleration of service processes, less errors, and customer ratings. Through structural equation modeling, it was confirmed that operational efficiency mediates relationship between technology adoption and customer satisfaction and the fact that internal process optimization is very important. Companies that implemented digital technologies more intensively and over a more extended period also showed better performance, which means that to gain maximum benefits, companies should use digital technologies in a long-term and integrated manner. Such results are used to comprehend the digital transformation issue in the new market hospitality settings and offer empirical data to support the strategic value of technology investment in service excellence (Ukpabi and Karjaluo, 2016; Nawaz and Iqbal, 2025; Rasheed et al., 2023).

Recommendations

According to the results of the study, a number of recommendations are noted to the enterprises of hospitality and tourism in Lahore. To begin with, companies need to focus on investing in digital technologies like AI-based customer service solutions, mobile reservation systems, and combined CRM solutions so that the service delivery and satisfaction levels can improve. Second, the enterprises are supposed to introduce capacity-building programs and managerial training as part of enhancing technology use, system integration, and competence of the employees. Third, continuing with essential technologies and rolling out digital adoption step-by-step may be beneficial to the firms with limited resources as they grow. Fourth, working together with technology providers and consultants will assist in optimizing the implementation, minimising the operational disruptions and adapting solutions to the local market conditions. Lastly, policymakers and industry groups can also facilitate digital adoption through incentives, training and infrastructure enhancement that could create an atmosphere that promotes the use of technology to improve service delivery within the sector. All these recommendations are designed to help enable sustainable digital transformation, competitiveness and customer experiences in the Lahore hospitality and tourism industry.

References

1. Ahmed, Z., Khan, S., & Khan, M. (2021). Digital transformation in Pakistan's hospitality sector: Challenges and opportunities. *Journal of Tourism and Hospitality Management*, 9(2), 101–115.

2. Amaro, S., & Duarte, P. (2015). An integrative model of consumers' intentions to purchase travel online. *Tourism Management*, 46, 64–79.
3. Aman, S. (2025). Digital innovation and service performance in emerging hospitality markets. *Journal of Tourism Studies and Research*, 14(1), 22–39.
4. Bilgihan, A., Okumus, F., Nusair, K., & Kwun, D. J. W. (2011). Information technology applications and competitive advantage in hotel companies. *Journal of Hospitality and Tourism Technology*, 2(2), 139–154. Buhalis, D. (2003). *eTourism: Information technology for strategic tourism management*. Pearson Education.
5. Buhalis, D., & Law, R. (2008). Progress in information technology and tourism management: 20 years on and 10 years after the Internet. *Tourism Management*, 29(4), 609–623.
6. Creswell, J. W. (2025). *Research design: Qualitative, quantitative, and mixed methods approaches* (6th ed.). SAGE Publications.
7. Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13(3), 319–340.
8. Dwivedi, Y. K., Rana, N. P., Jeyaraj, A., Clement, M., & Williams, M. D. (2019). Re-examining the unified theory of acceptance and use of technology. *International Journal of Information Management*, 46, 234–247.
9. El Archi, R., & Benbba, M. (2023). Technology adoption and service performance in tourism firms: Evidence from developing economies. *Tourism Management Perspectives*, 45, 101–118.
10. Gössling, S., Scott, D., & Hall, C. M. (2021). Pandemics, tourism and global change: A rapid assessment of COVID-19. *Journal of Sustainable Tourism*, 29(1), 1–20. Gretzel, U., Sigala, M., Xiang, Z., & Koo, C. (2015). Smart tourism: Foundations and developments. *Electronic Markets*, 25(3), 179–188.
11. Hasni, A., Farah, S., & Adeel, R. (2021). ICT adoption and service quality in hotel industry of Pakistan. *International Journal of Hospitality & Tourism Administration*, 22(4), 365–384.
12. Hjalager, A. M. (2010). A review of innovation research in tourism. *Tourism Management*, 31(1), 1–12.
13. Hudson, S., & Thal, K. (2013). The impact of social media on the consumer decision process. *Journal of Travel & Tourism Marketing*, 30(1–2), 156–160.
14. Ip, C., Leung, R., & Law, R. (2012). Progress and development of information and communication technologies in hospitality. *International Journal of Contemporary Hospitality Management*, 24(4), 533–551.
15. Ivanov, S., & Webster, C. (2019). Adoption of robots, artificial intelligence and service automation by travel, tourism and hospitality companies. *Robotics*, 8(2), 1–18.
16. Kandampully, J., Zhang, T., & Bilgihan, A. (2015). Customer loyalty: A review and future directions. *International Journal of Contemporary Hospitality Management*, 27(3), 379–414.
17. Khan, A., Rasheed, F., & Zaman, K. (2020). Tourism-led growth hypothesis: Evidence from Pakistan. *Tourism Economics*, 26(7), 1127–1145.
18. Kim, T. T., Lee, G., & Law, R. (2008). An empirical examination of the acceptance behaviour of hotel front office systems. *International Journal of Hospitality Management*, 27(3), 500–513.
19. Kurnia, S., Karnali, R. J., & Rahim, M. M. (2015). A qualitative study of business-to-business electronic commerce adoption. *Information & Management*, 52(4), 482–498.
20. Law, R., Buhalis, D., & Cobanoglu, C. (2014). Progress on information and communication technologies in hospitality and tourism. *International Journal of Contemporary Hospitality Management*, 26(5), 727–750.

21. Law, R., & Jogaratnam, G. (2005). A study of hotel information technology applications. *International Journal of Contemporary Hospitality Management*, 17(2), 170–180.
22. Leung, D., Law, R., van Hoof, H., & Buhalis, D. (2013). Social media in tourism and hospitality. *Journal of Travel & Tourism Marketing*, 30(1–2), 3–22.
23. Lu, J., Mao, Z., Wang, M., & Hu, L. (2015). Goodbye maps, hello apps? *Tourism Management*, 46, 126–138.
24. Morosan, C., & DeFranco, A. (2016). It's about time: Revisiting UTAUT2. *International Journal of Hospitality Management*, 52, 146–159.
25. Morosan, C., & Jeong, M. (2008). Users' perceptions of two types of hotel reservation websites. *International Journal of Hospitality Management*, 27(2), 284–292.
26. Nawaz, M., & Iqbal, F. (2025). ICT adoption and service delivery in Pakistan's hospitality sector. *Journal of Tourism Studies and Research*, 8(2), 75–92.
27. Neuhofer, B., Buhalis, D., & Ladkin, A. (2015). Smart technologies for personalized experiences. *Electronic Markets*, 25(3), 243–254.
28. Ottenbacher, M., & Harrington, R. (2007). The innovation development process of Michelin-starred chefs. *International Journal of Contemporary Hospitality Management*, 19(6), 444–460.
29. Parasuraman, A., Zeithaml, V. A., & Berry, L. L. (1988). SERVQUAL. *Journal of Retailing*, 64(1), 12–40.
30. Rasheed, S., Farooq, U., & Khan, M. (2023). Digital tools and service efficiency in hospitality firms. *Asia Pacific Journal of Tourism Research*, 28(5), 567–585.
31. Rogers, E. M. (2003). *Diffusion of innovations* (5th ed.). Free Press.
32. Sigala, M. (2018). Social media and customer engagement. *International Journal of Hospitality Management*, 71, 1–9.
33. Sparks, B. A., & Browning, V. (2011). The impact of online reviews. *Tourism Management*, 32(6), 1310–1323.
34. State Bank of Pakistan. (2023). *Annual report on digital payments and financial inclusion*. SBP.
35. Thomas, R., Shaw, G., & Page, S. J. (2011). Understanding small firms in tourism. *Tourism Management*, 32(5), 963–976.
36. Tussyadiah, I. P. (2020). A review of research into automation in tourism. *Journal of Travel Research*, 59(3), 455–471.
37. Ukpabi, D. C., & Karjaluoto, H. (2016). Consumers' acceptance of ICT in tourism. *International Journal of Hospitality Management*, 57, 34–45.
38. Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology. *MIS Quarterly*, 27(3), 425–478.
39. Vermeulen, I. E., & Seegers, D. (2009). Tried and tested: Online hotel reviews. *Tourism Management*, 30(1), 123–127.
40. Wang, D., Xiang, Z., & Fesenmaier, D. R. (2016). Smartphone use in everyday life and travel. *Journal of Travel Research*, 55(1), 52–63.
41. Xiang, Z., & Gretzel, U. (2010). Role of social media in online travel information search. *Tourism Management*, 31(2), 179–188.
42. Xiang, Z., Magnini, V. P., & Fesenmaier, D. R. (2015). Information technology and consumer behavior. *Tourism Management*, 48, 113–122.
43. Zhu, K., Kraemer, K. L., & Xu, S. (2006). The process of innovation assimilation. *Management Science*, 52(10), 1557–1576.