



Adoption of Emerging Technologies in the Hospitality Industry: Evidence from Five-Star-Rated Hotels in Zanzibar, Tanzania

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ABSTRACT

Background: Emerging technologies are reshaping hospitality operations, service delivery, managerial decision-making, and guest experiences. In Zanzibar, where tourism is central to economic development, the adoption of these practices is increasingly important for five-star-rated hotels. However, evidence regarding the types and extent of emerging technologies adopted by hotels is limited and grossly undocumented.

Objective: This study examined the extent and nature of emerging technologies adoption in five-star-rated hotels in Zanzibar, focusing on artificial intelligence, big data analytics, virtual and augmented reality, the Internet of Things, cloud computing, and blockchain technology.

Methods: A mixed-methods approach was employed, integrating quantitative data collected via questionnaires from 251 hotel managers on adoption rates and qualitative evidence from open-ended responses. Quantitative data were used to determine the adoption levels across the selected technology domains. Simultaneously, qualitative responses explained how these technologies were applied in hotel operations, guest services, communication, revenue management, security, and decision-making.

Results: The findings show that adoption varies across technology domains. Cloud computing recorded the highest mean adoption score ($M = 4.14$), followed by big data analytics ($M = 4.13$), blockchain ($M = 3.96$), the Internet of Things (IoT) ($M = 3.57$), and artificial intelligence ($M = 3.08$). Virtual and augmented reality showed moderate adoption ($M = 2.40$). These technologies support property management, customer relationship management, online review analysis, digital security, energy management, contactless services, booking systems, payment processes, and guest personalization. Virtual and augmented reality have been reported to have moderate adoption and are primarily used for marketing, virtual tours, guest orientation, and online visibility.

Conclusion: Emerging technologies' adoption among five-star-rated hotels in Zanzibar is generally high but uneven across various technology types. Hotels primarily adopt technologies that provide immediate operational value, particularly in data management, communication, security, reservations, and revenue and guest services. More advanced and less operationally integrated applications are adopted moderately or selectively by organizations.

Unique Contribution: This study provides context-specific empirical evidence on the types, levels, and operational applications of emerging technologies in five-star-rated hotels in Zanzibar, Tanzania. This demonstrates that technology adoption is application-driven and reveals clear differences between widely integrated technologies, such as cloud computing and big data analytics, and selectively adopted technologies, particularly in virtual and augmented reality.



Key Recommendations: Hotel managers should adopt a phased and strategically integrated approach that consolidates widely used technologies while expanding underutilized applications based on operational relevance, expected returns, maintenance requirements, and guest acceptance. Policymakers and technology providers should support hotel-specific capacity building, technical assistance, and the development of interoperable solutions to facilitate effective and sustainable technology adoption.

Keywords: Artificial Intelligence; Big Data Analytics; Blockchain technology; Cloud Computing; Internet of Things; Virtual and Augmented Reality

INTRODUCTION

The global hospitality industry is undergoing a profound transformation driven by the rapid evolution and integration of new and emerging technologies. In the twenty-first century, technology has become deeply embedded in everyday life and business operations, reshaping how organizations design services, manage internal processes, and interact with customers in real time (Ponduri et al., 2023). In tourism and hospitality, digital transformation is no longer optional; it has become a strategic requirement for resilience, competitiveness, quality, and operational efficiency. Hospitality organizations increasingly rely on digital tools to improve decision-making, personalize guest experiences, streamline operations, and respond to shifting market expectations. The hospitality sector is experiencing a major digital transition in Africa. This transformation is shaped by technological innovation, shifting guest expectations, global competitive pressures, and the need for destinations to improve their service delivery.

Recent studies suggest that African hospitality firms are moving beyond early experimentation with basic ICT tools toward the wider adoption of emerging technologies that reconfigure service delivery, internal processes, and guest experiences (Asifat et al., 2025; Mavitha et al., 2025). As tourism contributes substantially to employment, foreign exchange earnings, entrepreneurship, and service sector growth, understanding the drivers, barriers, and outcomes of technology adoption has become important for hotel managers, policymakers, and researchers (Baloyi et al., 2025).

However, Africa's digital transformation trajectory differs from that of many developed markets. The adoption of emerging technologies is often shaped by uneven infrastructure, varying regulatory environments, heterogeneous consumer readiness, financial constraints, and limited technical capacity (Bindah et al., 2024; Bindah et al., 2025). Despite these challenges, evidence shows that many African firms are responding by adopting mobile-first strategies, context-sensitive digital solutions, and frugal innovation pathways that allow them to "leapfrog" certain stages of digital development (Nyagadza et al., 2025). Thus, technology adoption in African hospitality should not be viewed simply as a delayed imitation of developed markets but as a context-specific process shaped by local conditions, strategic priorities, and available resources. Within this broader African context, Zanzibar provides an important setting for examining the adoption of emerging technologies, as tourism is central to its economy and digital service standards increasingly influence hotel competition. Prior studies in Zanzibar have explored ICT



adoption as a driver of entrepreneurial project performance and service delivery in tourism (Mohamed, 2021). Simultaneously, the hotel technology landscape is expanding beyond basic ICT systems to encompass more advanced applications, including artificial intelligence, the Internet of Things, blockchain, cloud computing, big data analytics, and digital platforms. Developing destinations, such as Zanzibar, face distinct challenges in technology adoption and value realization compared to developed markets (Osadare et al., 2024; Mohamed, 2021).

Despite the growing research on ICT adoption and digital transformation in hospitality, little attention has been paid to the combined adoption of emerging technologies by five-star-rated hotels in Zanzibar. Existing studies mainly address general ICT use, mobile marketing, or single technologies, leaving a gap in examining how Artificial Intelligence (AI), big data analytics, Virtual and Augmented Reality (VAR), Internet of Things (IoT), cloud computing, and blockchain are adopted and applied in five-star-rated hotel operations to improve service quality.

Guided by this context, this study examined the extent and nature of emerging technology adoption in five-star hotels in Zanzibar. This study focuses on artificial intelligence, big data analytics, virtual and augmented reality, the Internet of Things (IoT), cloud computing, and blockchain. It also considers how these technologies contribute to hotel operations, guest experiences, decision-making, revenue management, and workforce processes. This study provides a coherent evidence base for academic understanding and practical decision-making in the hospitality sector.

LITERATURE REVIEW

Digital Transformation in Global Hospitality

Globally, digital transformation in hospitality is described as a shift toward technology-enabled, data-driven, and customer-centric service systems (Rai et al., 2026). Mavitha et al. (2025) explained that hospitality technology research increasingly covers front-office applications such as chatbots and mobile check-ins, as well as back-office analytics, such as revenue management systems and smart experience systems, including IoT-enabled rooms and immersive technologies. The COVID-19 pandemic accelerated this transformation. Baloyi et al. (2025) argue that the post-COVID period normalized contactless operations and accelerated digital adoption in Africa's service delivery environment. Similarly, Asifat et al. (2025) and Shasha et al. (2025) suggest that hospitality enterprises implemented mobile and contactless service technologies within months, although such changes might otherwise have taken years. This shows that crisis conditions can accelerate technology adoption by making digital service delivery necessary rather than optional.



African Hospitality Context

Africa's hospitality sector operates within both opportunities and constraints. Mobile connectivity and digital payment ecosystems provide favorable conditions for mobile-first strategies in tourism and hospitality (Taouil et al., 2025; Wang et al., 2025). However, many studies highlight persistent challenges, including unreliable infrastructure, limited capital, especially among small and medium enterprises, skills shortages, weak technical capacity, and implementation barriers (Naatu et al., 2024; Bindah et al., 2025; Shasha et al., 2025).

Despite these constraints, Nyagadza et al. (2025) emphasized the importance of frugal digital innovation in Africa. Many firms adopt pragmatic and context-appropriate solutions rather than directly replicating Western models of digital transformation. Mobile payment systems, online booking tools, and digital communication platforms are practical examples of leapfrogging in resource-constrained tourism environments (Taouil et al., 2025; Wang et al., 2025). Therefore, digital transformation in African hospitality is often selective and strategic, shaped by factors such as affordability, usability, infrastructure and immediate operational value.

Artificial Intelligence in Hospitality

Artificial intelligence is considered one of the most transformative technology clusters in the hospitality industry. Seraj et al. (2025) examined digital leadership and AI-enabled innovation and found that leadership capabilities were positively linked to productivity and innovation. Bathla et al. (2025) and Sabharwal et al. (2025) documented that AI and analytics support automation, service personalization, decision support, and operational efficiency. Ismail et al. (2025) found that AI-related automation in RAISA adoption improved performance through process efficiency and data-driven decision-making. Baburao et al. (2026) emphasized AI-enabled revenue management, particularly dynamic pricing and demand prediction, whereas Sultan et al. (2025) showed that stronger analytical capabilities improve forecasting and optimisation.

However, the adoption of AI is not without challenges. Shasha et al. (2025) cautioned that AI-driven transformation may lead to negative outcomes when cybersecurity risks, ethical concerns, and/or weak implementation capacities are not addressed. Bindah et al. (2025) similarly note that limited skills and weak organizational readiness can constrain adoption, particularly among SMEs. Osadare et al. (2024) argued that AI is gaining momentum through chatbots, virtual assistants, predictive modelling, and sentiment analysis.

IoT, Cloud Computing, Digital Platforms, and Regional Evidence

IoT-enabled smart hotel systems have been widely discussed as tools for improving energy efficiency, security, predictive maintenance, and personalized guest experience. Saber et al. (2025), in a study of IoT use in Egyptian hotels, found positive associations between IoT and customer loyalty, driven by convenience and service personalization. Krishnan (2025) and Danekula (2025) highlighted that smart energy management is particularly valuable in contexts



where utility costs and service reliability are important topics. However, Shasha et al. (2025) warned that the IoT increases cyber and interoperability risks when firms lack strong governance and technical capacity to manage them. Consequently, Krishnan (2025) recommends a phased implementation, beginning with high-impact, lower complexity applications before moving toward fully integrated smart ecosystems.

Cloud computing also plays an important role in the hospitality industry. Aroba et al. (2025) showed in an ERP-focused case study that readiness and integration complexity are central to enterprise system implementation. Challa (2025) argues that SaaS and cloud platforms enhance an organization's flexibility, scalability, automation, and operational resilience. Digital platforms, including online travel agencies and review sites, expand market reach and support international access to tourism products and services. George (2025) argues that digital platforms strengthen destination branding, visibility, and market engagement. However, Shasha et al. (2025) warned that dependence on platforms and commission structures can increase pressure on profits and reduce strategic autonomy.

Regional evidence indicates that technology adoption in the hospitality sector is heterogeneous. In North Africa, particularly in Egypt and Morocco, adoption pathways appear to be more structured. Ismail et al. (2025) found that data security and compatibility strongly shape RAISA adoption and performance in Egypt. Seraj et al. (2025) showed that digital leadership supports innovation and productivity. In Morocco, Taouil et al. (2025) documented growing fintech adoption, despite structural constraints. In West Africa, Aliyu & Beyioku (2025) found that hotel staff in Lagos were willing to adopt robots to improve service quality. In contrast, Affran et al. (2025) show that service innovation in Ghana improves productivity and retention. However, Naatu et al. (2024) cautioned that infrastructure and capability gaps continue to shape the adoption outcomes in sub-Saharan Africa.

In East Africa, digital transformation is often associated with mobile infrastructure and sustainability issues. Onyango (2025) found a positive relationship between digital technology and sustainability of blue tourism in Tanzania. Wang et al. (2025) and Taouil et al. (2025) argue that mobile platforms and digital payments provide a practical foundation for the broader digital transformation of tourism. In Zanzibar, ICT already supports communication, booking, administrative tasks, mobile marketing, and access to international markets (Mohamed, 2021; Haji, 2024). However, MA and AA (2021) noted that many Tanzanian tourism enterprises still need to move beyond basic ICT use to advanced analytics and strategic digital decision-making.

THEORETICAL FRAMEWORKS

Technology Acceptance Model

The Technology Acceptance Model (TAM) has been widely applied in studies on guest-facing technology. The model explains adoption through perceived usefulness and ease of use. In a



study conducted in South Africa, Kwindu et al. (2025) examined customer satisfaction and adoption regarding service robots in restaurants. They found that perceived usefulness and ease of use were important predictors of technology acceptance.

In Zanzibar, Haji (2024) applied the Technology Acceptance Model to mobile marketing adoption and found that perceived ease of use and technology ease of use significantly influenced behavioral intentions. Although perceived usefulness is a central pillar of TAM, Haji (2024) showed that it may be insufficient if user attitudes are unfavorable. This highlights the importance of reducing technology anxiety and ensuring that digital tools are user-friendly for employees and customers alike. In the hotel sector, this means that digital systems must not only improve performance but also be simple, reliable, and user-friendly.

RESEARCH METHODS

The study was conducted in Zanzibar, Tanzania, a major tourist destination where five-star-rated hotels are increasingly adopting emerging technologies. A mixed-methods convergent parallel design was employed, in which quantitative and qualitative data were collected simultaneously, analyzed separately, and integrated for their interpretation. This study targeted the managers of five-star-rated hotels in Zanzibar. Using Yamane's formula, 49 hotels were selected from a population of 56 hotels. Stratified sampling was applied to the seven departments of five-star-rated hotels in the study. Data were collected using structured questionnaires administered to hotel managers. Quantitative data were analysed using SPSS version 23 through descriptive statistics, while qualitative data were analyzed using content analysis and integrated with the quantitative findings.

FINDINGS OF THE STUDY

Adoption Level of Emerging Technologies

The findings show that five-star hotels in Zanzibar have adopted several emerging technologies, although adoption varies by technology type. Most technologies recorded high adoption rates in this study. Cloud computing technologies had the highest mean adoption score (4.14), followed by big data analytics (4.13), blockchain technologies (3.96), IoT (3.57), and artificial intelligence (3.08). Virtual and augmented reality recorded only moderate adoption, with a mean score of 2.40. These results indicate that five-star-rated hotels in Zanzibar prioritize technologies that directly support operations, data management, communication, security, revenue management, guest relationship management, and service efficiency.

Artificial Intelligence Adoption

Artificial intelligence has been adopted mainly for guest-facing and decision-support functions. AI-driven sentiment analysis of online reviews recorded the highest adoption rate (75.0%), suggesting that hotels use AI to monitor customer feedback, manage their online reputation, and



support service recovery. Real-time translation systems on hotel websites were used by 63.9% of hotels, indicating the importance of multilingual communication with international guests in the hospitality industry. Basic FAQ responses and predictive personalization recorded 61.1%, whereas AI-powered chatbots, contactless check-in, digital keys, and AI-based dynamic pricing each recorded 58.3%. AI-enhanced housekeeping and maintenance systems accounted for 55.6% of the applications.

However, AI adoption was lower for workforce-related functions than for other areas. AI-powered recommendation systems for personalized guest services recorded 50.0%, and AI-driven work scheduling recorded 44.4%. This indicates that hotels are more comfortable adopting AI in guest-facing and revenue-related applications than in internal human resource functions. Qualitative findings showed that hotels use chatbots, virtual assistants, generative AI tools such as ChatGPT, biometric systems, AI-based network monitoring, and AI-driven operational analyses. These technologies reduce the staff workload, support faster responses, improve decision-making, and enhance guest satisfaction.

Big Data Analytics Adoption

Big data analytics has a high adoption rate across various industries. Integrated property management systems were adopted by 90.9% of hotels, underscoring the central role of data integration across reservations, front office, housekeeping, finance, and guest services. Social media analytics and online review analysis tools recorded 88.5%, and customer relationship management platforms recorded 88.1%. Predictive analytics recorded 74.2%, and guest profiling systems and personalized guest-offer tools each recorded 71.4%. Data-driven performance management systems recorded 65.9%, which, although substantial, was lower than other BDA applications.

Qualitative findings showed that hotels use OPERA Cloud, PMS platforms, CRM systems, Medallia, Power BI, Prolarr, Loyverse, WhatsApp integration, email systems, and loyalty applications such as Accor Member Platforms. These systems support forecasting, guest profiling, feedback analysis, revenue management, targeted marketing, service quality improvement, and strategic decision-making. The findings show that five-star hotels in Zanzibar are moving from basic ICT use to more advanced data-driven practices in their daily operations.

Virtual and Augmented Reality Adoption

Virtual and augmented reality have seen moderate adoption. Virtual tours and augmented reality applications were adopted by 62.3% of hotels, whereas 56.0% of hotel websites had VAR content. However, more advanced applications had lower adoption rates: virtual and augmented reality spaces recorded 34.5%, VAR-enabled mobile applications recorded 31.7%, and VAR-based staff training recorded 42.9% of total adoptions. Qualitative findings revealed that VAR is mainly used for marketing, guest engagement, guest orientation, property visibility, and pre-



arrival decision-making. Some hotels in the region use 360-degree virtual tours to showcase sea-view rooms, guest rooms, spas, restaurants, gyms, and other hotel facilities to potential customers. Some hotels provide VR headsets at the front desk so that guests can preview the rooms and facilities before deciding to book. AR-based maps and location-based guides also help guests explore hotel facilities and nearby attractions. However, VAR remains selective and complementary rather than fully integrated into core operations.

Internet of Things Adoption

IoT adoption is high, particularly in security, access control, energy management, and convenience. Automated security systems with CCTV surveillance had the highest adoption rate (91.3%). IoT-enabled electronic keyless room entry and digital keys recorded 80.2%, and sensors for energy savings recorded 77.4% agreement. Automated emergency response systems recorded 60.7%, and smart room applications recorded 57.9%. Connected mini-bars that automatically charge guests had the lowest adoption rate (27.4%). Qualitative findings showed that hotels use Tesa Abloy digital key systems, mobile access, automated doors, CCTV cameras, fire alarms, smoke detectors, emergency alert systems, smart lighting, air-conditioning controls, Wi-Fi integration, 5G connectivity, PMS-linked monitoring, POS integrations, and loyalty system connections. These applications support safety, operational reliability, energy efficiency, guest convenience, and cross-departmental coordination in hotels. The low adoption of connected mini-bars suggests that hotels are cautious about IoT applications with uncertain returns, higher maintenance requirements, and potential issues with guest acceptance.

Cloud Computing Technologies Adoption

Cloud computing technologies have the highest adoption rates. Cloud-based property management systems for reservations and front desk operations recorded a 91.7% adoption rate. Cloud-based communication tools recorded 88.9%, and cloud storage solutions and cloud-hosted customer relationship management platforms recorded 86.1%. Cloud-based POS systems, cloud-hosted HR systems, and cloud-based housekeeping and maintenance management platforms each accounted for 75.0%. Qualitative findings showed extensive use of OPERA Cloud, Google Workspace, cloud-based POS systems, CRM platforms, HR systems such as Aruti, housekeeping and maintenance platforms such as ALICE, and communication tools such as WhatsApp, Google Teams, Zingle, Signal, email systems, and walkie-talkie applications. These systems support reservations, billing, room allocation, data storage, reporting, staff coordination, guest communication, revenue tracking, and service responsiveness. The findings indicate that cloud computing is the operational backbone of digital hotel management in Zanzibar, Tanzania.

Blockchain Technologies Adoption

Blockchain technologies have been widely adopted in the hospitality industry, especially for booking, identity verification, smart contracts, and payment applications. Blockchain-based smart contracts and blockchain platforms for guest identity verification each recorded an 80.6%



adoption rate. Blockchain-based booking systems recorded 77.4% and blockchain-enabled payment systems recorded 63.9%. Qualitative findings indicate that hotels use blockchain-enabled booking and channel management systems, such as Micros, Fidelio, DPO, Masher, and other digital channel managers, to manage their operations. These platforms consolidate bookings from online travel agencies, such as Booking.com, Expedia, and Agoda, helping reduce double bookings, improve reservation accuracy, enhance transparency, and strengthen guest trust. Blockchain also supports secure payment links, virtual cards, POS-integrated payments, guest profile accuracy, transaction traceability, and revenue management. However, the slower adoption of blockchain-enabled payments indicates that full integration into financial transactions lags behind the adoption of booking and identity-verification processes.

DISCUSSION OF FINDINGS

The findings show that five-star-rated hotels in Zanzibar are undergoing digital transformation, but adoption differs across technologies and hotel functions. This pattern is consistent with Kozar et al. (2025) and Rai et al. (2026), who described global hospitality transformation as a movement toward technology-enabled, data-driven, and customer-centered service systems. This also supports Asifat et al. (2025) and Mavitha et al. (2025), who argued that African hospitality firms are moving beyond basic digital tools toward more advanced technologies that reshape service delivery, internal operations, and the guest experience.

The dominance of cloud computing and big data analytics indicates that digital transformation in Zanzibar's five-star-rated hotels is increasingly driven by data infrastructure and integrated operational systems. This supports Challa (2025), who argued that cloud platforms improve a business's flexibility, scalability, and resilience.

The relatively high but selective adoption of AI confirms that Zanzibar's five-star-rated hotels are integrating AI mainly where it improves guest interaction, revenue management, and service responsiveness. The adoption of AI sentiment analysis, chatbots, translation systems, and dynamic personalized predictive personalization aligns with Osadare et al. (2024), who observed the growing use of AI in Zanzibar through chatbots, virtual modeling, predictive analysis, and sentiment analysis. This also supports Baburao et al. (2026), who identified dynamic pricing and demand prediction as important AI value pathways, and Bathla et al. (2025), Sabharwal et al. (2025), and Sultan et al. (2025), who linked AI and analytics to automation, decision support, and personalization.

However, the lower adoption of AI in workforce scheduling and personalized recommendation systems suggests that AI has not yet been fully embedded across all hotel functions and operations. This supports Shasha et al. (2025), who cautioned that cybersecurity risks, ethical concerns, and weak implementation capacity could limit AI transformation. Bindah et al. (2025) similarly noted that skill gaps and limited organizational readiness constrain adoption. Therefore,



AI adoption in Zanzibar appears to be progressive but uneven, with stronger uptake in guest-facing functions and weaker integration into internal workforce management systems than in other countries.

The high adoption of big data analytics indicates that five-star-rated hotels in Zanzibar are becoming increasingly data-driven. The use of PMS, CRM, online review analytics, predictive analytics, guest profiling, and loyalty systems shows that hotels are using data to improve forecasting, guest relationship management, targeted marketing, and service quality. This aligns with Bathla et al. (2025), Sabharwal et al. (2025), and Sultan et al. (2025), who argued that analytics support automation, service personalization, decision-making, forecasting, and performance optimization.

The findings also extend Mohamed (2021) argument that ICT adoption improves tourism and hospitality performance in Zanzibar. Unlike earlier, more basic ICT use, the current findings show that five-star-rated hotels are adopting more advanced analytics tools, including OPERA Cloud, Medallia, Power BI, Prolarr, Loyverse, CRM platforms, and loyalty apps. However, the low adoption of data-driven performance management systems supports MA and AA (2021), who argue that Tanzanian tourism enterprises still need to strengthen their use of ICT for strategic analytics and internal decision-making to improve performance.

The moderate adoption of virtual and augmented reality suggests that these technologies are primarily used for marketing and guest engagement rather than for full operational integration. This aligns with George (2025), who argued that digital platforms and destination branding technologies enhance visibility and market engagement. In Zanzibar, 360-degree tours, virtual room previews, AR maps, and website-based VAR content help hotels showcase their facilities and support guest decision-making before arrival.

However, the limited adoption of advanced VAR applications reflects the constraints identified by Naatu et al. (2024), Bindah et al. (2025), and Shasha et al. (2025), including infrastructure limitations, capital constraints, technical skill shortages, and uncertainty regarding returns. Compared with cloud computing and IoT, VAR may be perceived as less essential for daily operations. Therefore, VAR adoption remains selective, complementary, and more strongly linked to marketing than to core operational transformations.

The high adoption of IoT in security, digital access, and energy management suggests that hotels prioritize technologies that deliver immediate operational benefits. CCTV systems, digital keys, energy-saving sensors, emergency alerts, and smart room technologies support safety, convenience, cost reduction, and sustainability. These findings are consistent with those of Saber et al. (2025), who found that IoT-enabled smart hotel systems improve convenience, personalization, and loyalty. They also support Krishnan (2025) and Danekula (2025), who



emphasized the value of smart energy management, particularly in contexts where utility costs and service reliability are key concerns.

The low adoption of connected mini-bars shows that not all IoT applications are equally attractive to consumers and/or hotel operators. Hotels appear to prefer applications that address essential operational needs and delay those perceived as costly, risky, or less essential. This aligns with Krishnan (2025), who recommends a phased adoption approach, beginning with high-impact, low-complexity applications, before scaling toward fully integrated smart ecosystems.

Cloud computing has emerged as the most widely adopted technology, confirming its foundational role in hotel digital transformation. The widespread adoption of cloud-based PMS, communication tools, storage systems, CRM platforms, POS systems, HR systems, and housekeeping platforms supports Challa's (2025) argument that cloud systems enhance flexibility, scalability, automation, and resilience. These findings also align with Aroba et al. (2025), who emphasized readiness and the complexity of integration in enterprise system implementation.

In Zanzibar, cloud computing supports operational coordination, real-time communication, data storage, reservations, billing, guest profiling, revenue reporting, and improved service responsiveness. The use of OPERA Cloud, Google Workspace, Micros Oracle products, Canary Cloud, Aruti, ALICE, and communication platforms indicates that cloud systems are actively embedded in daily hotel operations rather than being symbolic of innovation. This also supports the TOE framework, particularly the role of organizational readiness, system compatibility, and managerial commitment in adoption outcomes (Ismail et al., 2025; Aroba et al., 2025; Nikopoulou et al., 2023).

The high adoption of blockchain in booking, identity verification, and smart contracts suggests that hotels value technologies that enhance transparency, security, trust, and reliability. This supports the broader literature that positions digital transformation as a means of improving operational security, service reliability, and transaction integrity in the hotel industry.

However, the lower adoption of blockchain-enabled payments suggests that their full integration into financial transactions is a gradual process. This may reflect regulatory uncertainty, compatibility with the banking system, user familiarity, and other challenges. This finding supports Shasha et al. (2025)'s argument that digital transformation could be constrained by governance, cybersecurity, and implementation capacity. This aligns with Taouil et al. (2025) and Wang et al. (2025), who noted that digital payment systems are expanding in tourism-facing services but remain shaped by infrastructure, consumer readiness, and financial system compatibility issues.



CONCLUSION

The study concludes that five-star-rated hotels in Zanzibar have made substantial progress in adopting emerging technologies, although adoption varies across different technological domains. Cloud computing technologies recorded the highest adoption rate, followed by big data analytics, blockchain, the Internet of Things (IoT), and artificial intelligence (AI) technologies. This indicates that five-star-rated hotels in Zanzibar are shifting toward digital, data-driven, and technology-supported operations to improve performance.

The study further concludes that the adoption of emerging technologies in Zanzibar's five-star-rated hotels is driven by the need to enhance operational efficiency, improve guest experience, strengthen decision-making, support revenue optimization, and increase service responsiveness.

Finally, the study concluded that technology adoption was uneven across the sample. Infrastructure-based and operationally essential technologies, such as cloud computing, big data analytics, IoT, and blockchain, are being adopted more widely. In contrast, experiential or technically demanding technologies such as VAR and advanced AI workforce applications are adopted cautiously.

Contribution of the Study

Empirical Contribution

Empirically, this study provides context-specific insights into how artificial intelligence, big data analytics, the Internet of Things, cloud computing, blockchain, and virtual and augmented reality can be applied in hotel operations to support service quality, operational efficiency, secure transactions, and guest experience.

Practical / Applied Contribution

Practically and managerially, this study offers useful guidance to hotel managers and owners on integrating digital systems into daily operations, strengthening employees' confidence and improving departmental performance.

Policy Contribution

From a policy perspective, this study contributes to the literature by identifying the need for infrastructure improvement, capacity-building programs, regulatory guidance, cybersecurity awareness, and incentives for technological investments.

Contextual / Geographical Contribution

Contextually and geographically, this study contributes by focusing on five-star-rated hotels in Zanzibar and demonstrating how digital transformation can support the development of a more digitally advanced hospitality industry.



RECOMMENDATIONS

Based on the findings presented in this study paper, there are implications for practice and policy.

Implications for Practice

The study recommends that hotel managers and owners expand the use of artificial intelligence beyond guest-facing applications, such as chatbots, sentiment analysis, and translation systems, to include workforce scheduling, employee performance monitoring, predictive maintenance, internal decision-making, and operational planning in the hotel industry.

Hotel managers should also expand the use of virtual and augmented reality applications for marketing, staff training, guest orientation, virtual room previews, interactive maps, and enhancing local destination experience.

Continued investment in IoT technologies is recommended, particularly in smart rooms, energy management, automated safety systems, and guest-convenience applications.

Cloud computing should be strengthened as the backbone of digital hotel operations by fully integrating PMS, CRM, HR, POS, housekeeping, maintenance, and communication systems across departments, while prioritizing cloud data security, backup systems, access control, and staff training.

Blockchain technology should be strategically used to improve booking transparency, payment security, identity verification, and transaction reliability through collaboration among hotels, financial institutions, technology providers, and regulators in the region.

Employees should receive continuous practical training to reduce their resistance to technological change and improve their confidence in using AI tools, PMS analytical platforms, dashboards, Internet of Things (IoT) systems, and digital guest-service applications.

Policy implications

Policymakers, hotel associations, and tourism stakeholders in Zanzibar should support digital transformation through infrastructure improvements, capacity-building programs, regulatory guidance, cybersecurity awareness, and incentives for technology investment, thereby helping five-star-rated hotels and the wider hospitality industry to improve their performance and position Zanzibar as a digitally advanced tourist destination.



Ethical clearance

The ethical principles of research were followed in this study.

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Author Contributions

All authors contributed equally to the conception and design of this study.

Conflict of Interest

The authors declare no potential conflicts of interest with respect to the research, authorship, or publication of this study article.

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Artificial Intelligence (AI) Use Disclosure

During the preparation of this manuscript, the author(s) used Grammarly for language editing, grammar correction, readability improvement, and formatting. The author(s) carefully reviewed, revised, and verified all outputs generated by the tool and took full responsibility for the accuracy, originality, and integrity of the manuscript's content.

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