

# The Moderating Role of Digital Maturity in the Relationship Between the Adoption of Emerging Technologies and Performance of Five-Star-Rated Hotels in Zanzibar

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## Abstract

Hotels in developing countries are increasingly adopting emerging technologies, particularly Cloud Computing Technologies (CCT), Big Data and Analytics (BDA), Virtual and Augmented Reality (VAR), Internet of Things (IoT), and Blockchain Technologies (BCT), including artificial intelligence (AI), to improve performance. However, studies remain fewer and more fragmented, and digital maturity is often conceptualized broadly rather than examined as an organizational capability that determines how hotels translate technology adoption into performance. Digital maturity determines how hotels translate emerging technologies into performance outcomes. This study determines the moderating effect of digital maturity on the relationship between the adoption of emerging technologies and performance in five-star-rated hotels in Zanzibar. This study used a quantitative research design to collect data from 392 hotel managers across 56 five-star-rated hotels via a structured questionnaire. Partial least squares structural equation modeling (PLS-SEM) was used to test the moderating effects of digital maturity on the relationship between the adoption of emerging technologies and operational efficiency, financial performance, and employee performance. Digital maturity exerted strong positive direct effects on employee performance ( $\beta = 0.904$ ,  $p < 0.001$ ) and financial performance ( $\beta = 0.805$ ,  $p < 0.001$ ), but a negative direct effect on operational efficiency ( $\beta = -0.130$ ,  $p < 0.01$ ). The moderating effect was significant only for operational efficiency ( $\beta = 0.106$ ,  $p = 0.040$ ), with non-significant moderation for financial performance ( $\beta = 0.016$ ,  $p = 0.771$ ) and employee performance ( $\beta = -0.049$ ,  $p = 0.141$ ). The model explained 83.5% of the variance in employee performance and 64.1% of the variance in financial performance, but only 9.0% of the variance in operational efficiency. This study used a mixed-methods convergent parallel design, with moderation analysis conducted using PLS-SEM to examine operational efficiency, financial performance, and employee performance. The

model strongly explained employee performance ( $R^2 = 0.835$ ; adjusted  $R^2 = 0.833$ ) and substantially explained financial performance ( $R^2 = 0.641$ ; adjusted  $R^2 = 0.637$ ), but weakly explained operational efficiency ( $R^2 = 0.090$ ; adjusted  $R^2 = 0.079$ ). Digital maturity significantly moderated only the relationship between adoption of emerging technologies and operational efficiency ( $\beta = 0.106$ ,  $t = 2.052$ ,  $p = 0.040$ ). Simultaneously, moderation was not significant for financial performance ( $\beta = 0.016$ ,  $p = 0.771$ ) or employee performance ( $\beta = -0.049$ ,  $p = 0.141$ ). The study concluded that digital maturity selectively enhances the operational value of emerging technologies in the hospitality sector. Hotels strengthen alignment across their digital strategies, staff digital competence, leadership support, cybersecurity, and data privacy. The study contributes context-specific evidence from Zanzibar by showing that digital maturity has performance-specific effects and selectively moderates the relationship between emerging technology adoption and hotel performance.

**Keywords:** Digital maturity, emerging technologies, five-star-rated hotels, Zanzibar, hotel performance

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## Introduction

Digital transformation is increasingly reshaping the hospitality sector by influencing how hotels organize their operations, deliver services, manage

employees, control costs, and respond to changing guest expectations. Emerging technologies such as artificial intelligence, the Internet of Things, big data analytics,

cloud-based hotel systems, biometrics, and immersive applications are widely associated with stronger process automation, service responsiveness, and overall performance improvement (Shangwa & Salama, 2024; Alhammadi, 2025). Nevertheless, existing evidence indicates that the outcomes of technology adoption vary across hotels, suggesting that the mere presence of digital tools does not automatically guarantee better organizational results (Anwar et al., 2024; Ezzaouia & Bulchand-Gidumal, 2022).

This issue is particularly important in Zanzibar, where tourism is a pillar of the archipelago's economy, and the recent expansion of the luxury accommodation segment has intensified the strategic importance of hotel performance. Between 2020 and 2023, eight new five-star hotels opened in Nungwi, Matemwe, Pwani Mchangani, Kizimkazi, Michamvi, Pongwe, and at the airport. As five-star-rated hotels operate at the premium end of the market, they increasingly compete on service reliability, experience, and digital responsiveness (World Bank, 2019). In this context, emerging technologies are not merely tools for modernization; they are strategic assets that may strengthen operational efficiency, financial performance, and employee performance, which represent some of the most immediate organizational outcomes of technology adoption before broader outcomes such as competitiveness or brand image materialize (Gajić et al., 2024; Ezzaouia & Bulchand-Gidumal, 2022).

However, the research problem is that hotels adopting similar technologies do not necessarily achieve similar performance outcomes. This suggests that other organizational conditions may influence the effectiveness of translating emerging

technologies into practical applications. In this study, this condition is digital maturity, which is conceptualized as a multidimensional organizational capability involving strategic alignment, digital infrastructure, systems integration, employee skills, leadership support, cybersecurity, data privacy, and process optimization (Bititci et al., 2015; Thordsen et al., 2020; Ka et al., 2023; Nikopoulou et al., 2023).

Drawing on the Digital Maturity Model, this study argues that digitally mature hotels are more likely to translate technology adoption into meaningful performance gains because they possess the organizational readiness, integrated processes, and digital capabilities required for effective technology implementation and utilization in the hospitality industry.

Despite the growing recognition of digital maturity in digital transformation research, few hospitality studies, particularly in developing countries, have statistically examined whether digital maturity moderates the relationship between the adoption of emerging technologies and hotel performance (Tan et al., 2026; Garbin Praničević et al., 2011; Fornells et al., 2024). This creates a clear research gap, especially in Zanzibar's five-star-rated hotel segment, where technology investment is increasing rapidly. However, resource constraints, uneven infrastructure, and capability gaps may shape the extent to which performance benefits are realized. Therefore, this study examines the moderating role of digital maturity in the relationship between the adoption of emerging technologies and the operational, financial, and employee performance of five-star hotels in Zanzibar. This study contributes to the hospitality digital transformation literature by explaining not only whether emerging technologies

influence hotel performance but also why their effects may vary across hotels operating in the same destination. It provides empirical evidence of the moderating role of digital maturity in the relationship between emerging technology adoption and hotel performance in the underexplored context of luxury hospitality in Sub-Saharan Africa. It also extends the Digital Maturity Model beyond diagnosis, using it as an analytical framework to explain performance variations across hotels. In practical terms, this study offers guidance on how technology investments can translate into operational, financial, and employee performance gains, particularly in resource-constrained hospitality settings.

### Research Objective

To determine the moderating effects of digital maturity on the relationship between the adoption of emerging technologies and performance in five-star-rated hotels in Zanzibar.

## Empirical Literature Review and Hypothesis Development

In hospitality, digital maturity is not limited to owning digital tools; rather, it reflects the effective use of technology to create value for both guests and businesses through integrated workflows, strategic alignment, and an innovation-oriented culture (Sakhanova et al., 2025). Similarly, Ka et al. (2023) conceptualized digital maturity in hospitality as the integration of business processes, digital technologies, digital capabilities, and strategic alignment, while Nikopoulou et al. (2023) emphasized the technological, organizational, and environmental drivers of digital transformation in hospitality.

Bititci et al. (2015) and Thordsen et al. (2020) suggest that organizations

differ in their ability to translate their digital capabilities into performance outcomes. In the hotel sector, digitally mature hotels are more likely to coordinate technologies, integrate systems, develop employee competence, protect data, and align digital initiatives with operational goals (Ka et al., 2023; Khlusevich et al., 2024). Sakhanova et al. (2025) further show that digital maturity varies across hotel segments and regions, often depending on capital availability, location, infrastructure, and the depth of technology use.

Stankova and Kaleychev (2023) reported variations in digitalization among five-star hotels, while Peng et al. (2024) identified digital readiness as a recurring theme in research on hospitality digital transformation. Garcia-Lopez et al. (2025) also show that hotel digital transitions vary across different technological solutions. Beyond hospitality, Jie et al. (2025) linked digital maturity to dynamic capabilities and innovation performance, while Suder et al. (2024) showed that digitalization mediates performance-related outcomes in hospitality entrepreneurship. Collectively, these studies suggest that digital maturity is a multidimensional organizational capability that can shape how effectively hotels translate the adoption of emerging technologies into improved performance outcomes.

Although prior studies have examined digital transformation, digital readiness, and performance outcomes, they do not fully address whether digital maturity moderates the relationship between the adoption of emerging technologies and hotel performance. This gap is especially evident in five-star-rated hotels in developing countries, where empirical testing of digital maturity as a moderator remains limited. Therefore, examining digital maturity as a moderating variable provides a clear basis

for understanding how the adoption of emerging technologies influences operational efficiency, financial performance, and employee performance in five-star-rated hotels.

### Operational Efficiency

The adoption of emerging technologies has become a critical strategy for enhancing operational efficiency in the hospitality industry sector. Technologies such as artificial intelligence (AI), the Internet of Things (IoT), big data analytics (BDA), cloud-based systems, property management systems, IoT-enabled energy controls, and automated workflow platforms are increasingly used to streamline operations, reduce costs, accelerate service delivery, and improve quality. These technologies are associated with stronger operational performance because they automate routine tasks, support predictive analytics, improve real-time data collection, and enable more informed decision-making (Sharma et al., 2023; Gajić et al., 2024; Anwar et al., 2024).

Gajić et al. (2024) showed that AI and IoT have a synergistic effect on hotel operations, with AI optimizing staff functions and management processes and IoT enhancing real-time monitoring and forecasting. Similarly, Anwar et al. (2024) found that AI, IoT, big data analytics, and cloud-based property management systems improve operational performance and guest satisfaction in Indonesian star-rated hotels. Their findings indicate that cloud-based systems can improve operational efficiency by up to 30%, AI can reduce staff workload by 70%, and data analytics can support more personalized and responsive service deliveries. Similarly, Singh et al. (2021) argue that digitalization and innovation are essential not only for improving guest experiences

but also for strengthening operational performance and sustaining competitiveness in the hospitality industry. However, the literature also shows that the operational potential of these technologies is not automatically realized.

Although emerging technologies are designed to reduce operational friction and costs, their effectiveness depends on the organizational conditions under which they are implemented. Vo et al. (2024) emphasized that hotels require adequate digital infrastructure, workforce competence, and strategic alignment to integrate these technologies into existing processes effectively. Similarly, Anwar et al. (2024) highlighted barriers such as high initial investment costs, system integration difficulties, and the need for comprehensive staff training. Gajić et al. (2024) cautioned that the widespread integration of technology raises concerns about data privacy, cybersecurity, and regulatory compliance. These studies collectively suggest that technology adoption alone does not guarantee stronger operational efficiency; the benefits depend on the broader organizational environment that supports implementation.

This perspective highlights the importance of digital maturity in shaping the relationship between emerging technology adoption and operational efficiency. Hotels with higher digital maturity are more likely to have the infrastructure, capabilities, and strategic readiness to translate technological investments into meaningful improvements in operational efficiency. In contrast, hotels with low digital maturity may adopt similar technologies but still face implementation gaps, redundant systems, and employee resistance, which can weaken the expected benefits (Bititci et al., 2015).

Thus, while the literature consistently links the adoption of emerging technologies to improved operational efficiency, it also indicates that the strength of this relationship depends on the extent to which hotels are digitally prepared to integrate and manage these tools in their operations. Therefore, digital maturity is expected to positively moderate the relationship between the adoption of emerging technologies and operational efficiency. Therefore, this study hypothesizes that;

*H<sub>01</sub>: Digital maturity does not moderate the relationship between the adoption of emerging technologies and operational efficiency.*

### Financial Performance

The adoption of emerging technologies and financial performance are linked in hospitality literature through both direct and indirect mechanisms. Empirical evidence generally supports this relationship, although the pathways and timing of financial gains differ across studies. Some studies emphasize immediate benefits through efficiency and cost reduction, showing that automation, energy management systems, mobile service platforms, and data-driven optimization can expand profit margins and improve profitability (Chandra, 2018). Other studies point to more indirect and longer-term effects, indicating that information technologies improve financial performance by strengthening personalization, convenience, customer satisfaction, loyalty, and positive word-of-mouth, which, in turn, support revenue growth and stronger sales performance (Ezzaouia & Bulchanda-Gidumal, 2022).

Related evidence also suggests that the financial contribution of technology may not always be immediate, but may emerge gradually through improved service quality, brand

enhancement, and occupancy performance (Mihalic & Buhalis, 2013). Collectively, these studies suggest a broad agreement that emerging technologies can improve financial performance. However, they also indicate that the magnitude and timing of these benefits depend on how effectively firms integrate technology into their operational and market-facing activities.

This relationship appears particularly relevant in hospitality settings, where digital maturity may shape the extent to which technology adoption yields measurable financial returns. Studies from developing and regional contexts show that digital tools such as e-marketing, e-transactions, online booking systems, electronic complaint handling, and accounting technologies strengthen revenue generation, accountability, and management efficiency when supported by appropriate organizational systems and implementation capacity (Mwakiremba, 2020). These findings imply that digital maturity may influence the extent to which hospitality firms can translate technology adoption into stronger financial outcomes, as technologically mature firms are more likely to possess the infrastructure, managerial readiness, staff capability, and integration capacity required to realize the value of digital investments.

Therefore, the literature suggests a positive connection between the adoption of emerging technologies and financial performance and provides a basis for expecting that this relationship may vary with digital maturity. In this sense, digital maturity is not merely a background condition but a plausible moderating factor that can strengthen or weaken the financial benefits of technology adoption. Therefore, this body of evidence justifies examining the hypothesis that:

*H02: Digital maturity does not moderate the relationship between the adoption of emerging technologies and financial performance.*

### Employee Performance

Empirical studies largely agree that technological integration improves employee performance by reducing routine workload, enhancing workflow clarity, improving access to information, and enabling faster, more accurate task execution. Ezzaouia and Bulchand-Gidumal (2022) and related studies show that technological tools enhance employee productivity by automating repetitive functions and providing real-time information. Stieglitz and Brockmann (2012) and Leung (2019) suggest that information technology can improve confidence, job satisfaction, communication, and flexibility in hotel operations. Evidence from Jordan and other hospitality contexts similarly indicates that knowledge-sharing platforms, technological infrastructure, and front-desk support technologies improve staff effectiveness, service accuracy, and overall work quality. (Ezzaouia & Bulchand-Gidumal, 2022). Rather than pointing to a single mechanism, these studies collectively suggest that employee performance improves when technology supports both operational efficiency and employee capabilities.

The literature also shows that the performance effects of emerging technologies depend on how organizations manage technological change. Parry and Battista (2023) argue that technologies such as AI, robotics, VR, AR, wearables, digital tools, and blockchain reshape work practices and require human resource departments to support skill development, organizational adaptation, and employee well-being. In a similar vein, Madanchian (2023) shows

that AI-based performance management tools can improve evaluation, training, and targeted human resource decisions. Ersoy and Ehtiyar (2023) found that the outcomes of AI adoption include not only performance gains but also changes in well-being, commitment, creativity, engagement, burnout, and turnover intentions. These findings indicate that employee performance gains are unlikely to arise automatically from technology adoption alone; they depend on communication, training, strategic clarity, and organizational support.

Therefore, digital maturity is highly relevant to the relationship between emerging technologies and employee performance. Organizations with greater digital maturity are more likely to have the infrastructure, leadership support, employee readiness, and change management capacity required to enable staff to use new technologies effectively. In contrast, low digital maturity may limit the performance benefits of adoption by creating skill gaps, uncertainty, resistance, and poor system integration. The literature provides a clear rationale for examining whether digital maturity moderates the relationship between emerging technologies and employee performance. This justifies testing the null hypothesis that.

*H03: Digital maturity does not moderate the relationship between the adoption of emerging technologies and employee performance.*

### Digital Maturity Model

Ka et al. (2023) hospitality digital maturity model provides a relevant framework for evaluating the hotels' digital transformation. The model identifies four interconnected dimensions of digital maturity: strategy and organization, digital technology, digital capabilities, and integrated business

processes. Strategy and organization involve strategic alignment, digital leadership, management literacy, and employees' digital skills. Digital technology refers to the deployment of modern digital tools and infrastructure, and digital capabilities encompass informatization, digital networking, and effective use of digital systems. Integrated business processes reflect the extent to which digital practices are embedded in hotel functions, including business management, marketing, customer relationship management (CRM), recruitment, and training. Together, these dimensions indicate a hotel's readiness for digital change and the extent to which digital solutions are integrated into its business model and operational processes.

The Digital Maturity Model is relevant to this study because it explains why the adoption of emerging technologies may not produce the same performance outcomes across all hotels. Technology adoption can improve operational efficiency, financial performance, employee performance, and guest experiences. However, digital maturity determines whether this potential translates into a realized performance. In this sense, the four dimensions of digital maturity operate as moderating conditions rather than direct predictors of performance. They shape hotels' absorptive capacity by determining whether the adopted technologies can be strategically aligned, technically supported, effectively used by employees, and integrated into daily business processes.

Therefore, hotels with higher digital maturity are more likely to translate the adoption of emerging technologies into improved performance because they possess stronger strategic direction, advanced digital infrastructure, skilled human resources, and integrated

digital processes. Conversely, hotels with lower digital maturity may adopt similar technologies but fail to realize their full benefits because of weak managerial readiness, limited digital competence, poor system integration, and inadequate infrastructure.

Thus, digital maturity strengthens, weakens, or alters the relationship between emerging technology adoption and hotel performance by shaping the extent to which technological potential translates into practical organizational value in the industry.

## Methodology

### Research Design

This study employed a quantitative research design to examine digital maturity as a moderating variable in the relationship between the adoption of emerging technologies and hotel performance in five-star-rated hotels in Zanzibar. The design was appropriate because the quantitative strand statistically tested the relationships between the adoption of emerging technologies, digital maturity, and performance outcomes.

### Study Area and Target Population

This study was conducted in five-star-rated hotels in Zanzibar. Zanzibar was selected because hotel technology adoption, digital infrastructure, managerial capacity, and institutional support may vary across destinations, countries, and regions. Focusing on a specific destination enabled this study to examine the moderating role of digital maturity within a well-defined hospitality context.

The target population comprised 392 departmental managers from 56 five-star-rated hotels in Zanzibar. Hotel managers were selected because they

are directly involved in technology adoption, departmental decision-making, performance monitoring, and service delivery. The study focused on managers from seven operational and functional departments: front office, housekeeping, food and beverage, security, human resources, finance, and communication technology (ICT).

### Sampling Techniques and Sample Size

Stratified sampling was applied at the departmental level to ensure the representation of seven key departments in each hotel. Within each departmental stratum, a census approach was used because the number of departmental managers in each hotel was manageable and directly relevant to the study objective. The planned sample was therefore 392 departmental managers, calculated as 56 hotels multiplied by seven departments. The quantitative analysis reported in this study is based on 252 valid responses from hotel managers in Zanzibar.

### Data Collection Instruments and Measurement of Variables

Quantitative data were collected using a structured questionnaire administered to hotel managers. The questionnaire measured the adoption of emerging technologies, digital maturity, and hotel performance using a Likert-type scale. The adoption of emerging technologies was measured across key technology domains relevant to the hotel sector, including artificial intelligence, big data analytics, the Internet of Things, cloud computing, and blockchain. Digital maturity was adapted from the hospitality digital maturity framework of Ka et al. (2023), particularly the dimensions related to strategy and organization, digital technology, digital capabilities, and integrated business processes. Hotel performance was operationalized into three dimensions: operational efficiency, financial performance, and employee performance.

**Table 1:** summarizes the major constructs and measurement approaches.

| Construct                      | Role in Model        | Measurement Focus   | Source/Development  | Response Format   |
|--------------------------------|----------------------|---|---|-------------------|
| Emerging technologies adoption | Independent variable | Adoption of AI, big data analytics, IoT, cloud computing, and blockchain technologies   | Adapted from technology adoption literature and aligned with the study objectives | Likert-type scale |
| Digital maturity               | Moderating variable  | Digital strategy alignment, digital infrastructure readiness, employee digital competence, leadership literacy and commitment, cybersecurity, and data privacy. | Adapted from Ka et al. (2023)   | Likert-type scale |
| Hotel performance              | Dependent variable   | Operational efficiency, financial performance, and employee performance   | Developed/adapted from performance dimensions aligned with the study objectives   | Likert-type scale |

Digital maturity was modeled as a single composite moderating construct rather than as separate direct-effect dimensions because this study sought to determine whether a hotel's overall maturity strengthens, weakens, or alters the relationship between the adoption of emerging technologies and performance outcomes. This treatment is theoretically appropriate because strategy, digital infrastructure, digital skills, and integrated processes collectively constitute a hotel's absorptive capacity to translate technology adoption into actual performance improvement.

### **Common Method Bias and Control of Contextual Variation**

As quantitative data were collected from hotel managers using a single questionnaire, procedural remedies were implemented to mitigate potential common method bias. Respondents were assured of anonymity and confidentiality; items were presented in a structured yet mixed order; and the questionnaire separated the measures of technology adoption, digital maturity, and performance outcomes to reduce the response patterns. Statistical diagnostics, including collinearity assessment, were considered in the PLS-SEM measurement model.

This study controlled for contextual variation by focusing on one hotel classification, five-star-rated hotels within a single destination, Zanzibar. This design reduced heterogeneity across hotel categories and destination environments. Additional hotel-level variables, such as hotel size, age, chain affiliation, occupancy rate, and market segment, were not modeled as statistical controls because they were not consistently available across all responding hotels. This is recognized as a methodological limitation and an area for future research.

### **Data Analysis**

Quantitative data were processed and analyzed using SPSS version 23 and SmartPLS version 4.0. Partial least squares structural equation modeling (PLS-SEM) was used to test the moderating role of digital maturity in the relationship between the adoption of emerging technologies and hotel performance. PLS-SEM was appropriate because the study involved multiple latent constructs, moderation effects, and a predictive-oriented model.

The PLS-SEM model assessed the relationships among the adoption of emerging technologies (independent variable), digital maturity (moderating variable), and three performance outcomes: operational efficiency, financial performance, and employee performance (dependent variables). The constructs were treated as reflective measurement models because the indicators were conceptualized as manifestations of underlying latent constructs. Moderation analysis was conducted by creating interaction terms between the adoption of emerging technologies and digital maturity for each performance outcome.

The PLS algorithm was implemented using a path-weighting scheme with standard SmartPLS settings for the maximum number of iterations and the convergence criteria. Bootstrapping was used to assess the significance of path coefficients, moderation effects, and structural relationships. The measurement model was evaluated using indicator loadings, the variance inflation factor (VIF), Cronbach's alpha, composite reliability, and average variance extracted (AVE). Discriminant validity was assessed using the Fornell-Larcker criterion and the heterotrait-monotrait ratio (HTMT), while model fit and structural adequacy were examined using the SRMR,  $R^2$ ,  $f^2$ ,  $q^2$ , path

coefficients, t-values, p-values, and significance of interaction effects.

### Reliability and Validity of the Instruments

Content validity was established through an expert review to confirm the clarity, relevance, and alignment of items with the study objectives. Internal consistency reliability was assessed using Cronbach's alpha, with 0.70 as the minimum acceptable threshold (Cronbach, 1951; Cronbach & Shavelson, 2004). The full questionnaire showed strong internal consistency, with the overall instrument achieving a Cronbach's alpha of 0.975 across 48 items. Construct-level reliability was also satisfactory, with Operational Efficiency (alpha = 0.861), Financial Performance (alpha = 0.978), Employee Performance (alpha = 0.983), and Digital Maturity (alpha = 0.981) exceeding the acceptable threshold.

For the retained PLS-SEM measurement model, reliability and validity were further confirmed using outer loadings, VIFs, composite reliability, and AVE. The retained indicators showed acceptable reliability and convergent validity: emerging technologies adoption retained five indicators (alpha = 0.901, CR = 0.926, AVE = 0.716), digital maturity retained three (alpha = 0.903, CR = 0.939, AVE = 0.838), employee performance retained three (alpha = 0.906, CR = 0.941, AVE = 0.842), financial performance retained three (alpha = 0.888, CR = 0.930, AVE = 0.815), and operational efficiency retained four (alpha = 0.801, CR = 0.840, AVE = 0.573). Indicators with weak loadings or excessive collinearity were removed where necessary, while theoretically meaningful indicators were retained when construct-level validity was deemed acceptable.

## Results

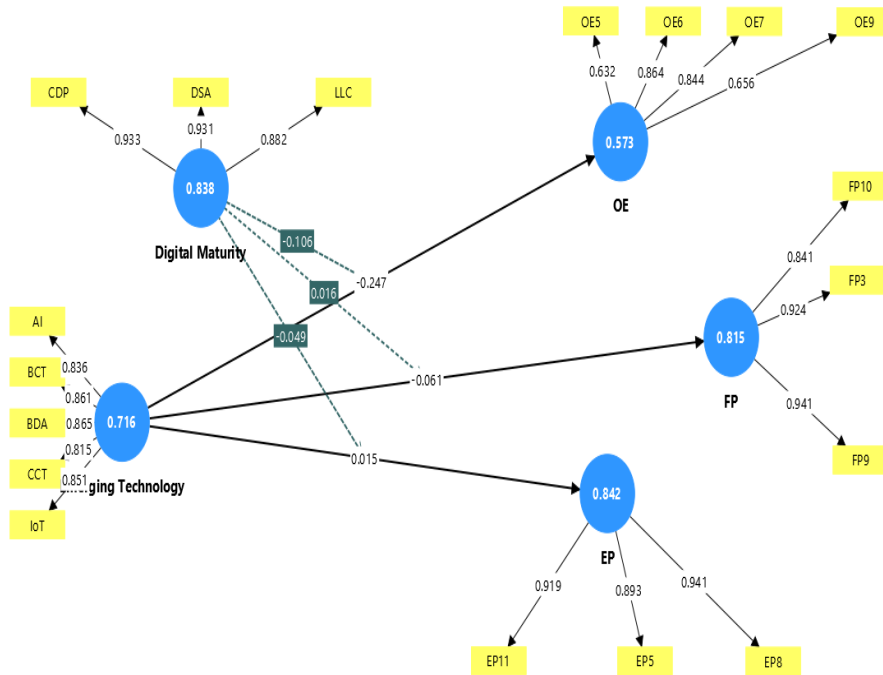
The reported  $f^2$  values (0.012 for significant moderation, 0.001, and 0.014 for non-significant) indicate negligible practical significance, even when statistical significance exists. Interpret whether the moderation effect of  $f^2 = 0.012$  is meaningful in management terms, regardless of statistical significance.

Simultaneously, the SRMR and NFI supported an acceptable fit. Table 2 shows HTMT values exceeding 0.85 (the conventional threshold) for DM-EP (0.913) and DM-FP (0.868), yet the text claims adequate discriminant validity. This is an error. HTMT > 0.85 indicates a failure of discriminant validity. Operational efficiency had an  $R^2$  of 0.090, whereas employee performance had an  $R^2$  of 0.835. This 9.3-fold difference suggests model misspecification regarding operational efficiency and calls for alternative model specifications rather than dismissing the low  $R^2$ .

### Assessment of Collinearity, Construct Validity, and Reliability

A structural model was developed using PLS-SEM to examine the relationships among emerging technologies (independent variables), digital maturity (moderating variable), and performance outcomes (Employee Performance (EP), Financial Performance (FP), and Operational Performance (OP)). Figure 1 presents the structural model illustrating the relationships among constructs, including outer loadings, Average Variance Extracted (AVE), and Variance Inflation Factor (VIF) values, which are used to assess collinearity, validity, and reliability.

As shown in Table 2, most measurement items exhibited satisfactory outer loadings, exceeding the recommended threshold of 0.70.



**Figure 1:** Diagrammatic Representation of Collinearity, Construct Validity, and Reliability

Although some operational efficiency indicators (OE5 and OE9) recorded loadings slightly below 0.70, these items were retained because the

AVE for the operational efficiency construct exceeded the minimum acceptable value of 0.50, consistent with Hair and Alamer (2022).

**Table 2:** Outer loadings, VIF, Construct Validity, and Reliability

| Variables              | Items | Outer loadings | VIF   | Cronbach's Alpha | CR    | AVE   |
|------------------------|-------|----------------|-------|------------------|-------|-------|
| Emerging Technologies  | AI    | 0.836          | 2.330 | 0.901            | 0.926 | 0.716 |
|                        | BCT   | 0.861          | 2.369 |                  |       |       |
|                        | BDA   | 0.865          | 3.161 |                  |       |       |
|                        | CCT   | 0.815          | 2.188 |                  |       |       |
|                        | IoT   | 0.851          | 2.844 |                  |       |       |
| Digital Maturity       | CDP   | 0.933          | 3.615 | 0.903            | 0.939 | 0.838 |
|                        | DSA   | 0.931          | 3.399 |                  |       |       |
|                        | LLC   | 0.882          | 2.345 |                  |       |       |
| Employee Performance   | EP11  | 0.919          | 3.129 | 0.906            | 0.941 | 0.842 |
|                        | EP5   | 0.893          | 2.560 |                  |       |       |
|                        | EP8   | 0.941          | 3.869 |                  |       |       |
| Financial Performance  | FP10  | 0.841          | 2.130 | 0.888            | 0.930 | 0.815 |
|                        | FP3   | 0.924          | 2.973 |                  |       |       |
|                        | FP9   | 0.941          | 3.628 |                  |       |       |
| Operational Efficiency | OE5   | 0.632          | 2.850 | 0.801            | 0.840 | 0.573 |
|                        | OE6   | 0.864          | 3.160 |                  |       |       |
|                        | OE7   | 0.844          | 1.549 |                  |       |       |
|                        | OE9   | 0.656          | 1.905 |                  |       |       |

Several indicators of digital maturity, financial performance, and employee performance were removed because of high multicollinearity, as indicated by VIF values exceeding the acceptable threshold of 5. Similarly, some operational efficiency items (OE1, OE2, OE3, OE4, OE8, and OE10) were excluded because of insufficient factor loadings.

Internal consistency reliability was confirmed for all retained constructs, as Cronbach's alpha values exceeded the recommended minimum of 0.70. The composite reliability (CR) values were also above 0.70, indicating strong internal consistency. Furthermore, the AVEs for all constructs exceeded 0.50, confirming adequate convergent validity.

### Assessment of Discriminant Validity and Model Fit

Discriminant validity is a type of validity that evaluates whether a measurement of a particular construct is different from other constructs that it should not be associated with, based on theoretical or conceptual frameworks (Rönkkö & Cho, 2022). Discriminant validity must be confirmed in future studies.

To prevent potential problems with construct, overlap, or redundancy. In the current study, the Fornell–Larcker criterion and the heterotrait–monotrait (HTMT) ratio of correlations (Table 3)

approach were used to assess the discriminant validity. This approach is widely used to determine whether each construct in a model measures a distinct concept, rather than simply varying other constructs in the study (Rönkkö & Cho, 2022). The criterion involves comparing each construct's AVE to the correlations between that construct and the different constructs in the model. The square root of the AVE for a construct should be greater than its correlations with other constructs, indicating that the construct captures more unique variance than it shares with other constructs (Fornell & Larcker, 1981).

More precisely, if the square root of the AVE for a given construct exceeds the inter-construct correlations, it indicates that the construct is more strongly associated with its own measures than with the measures of other constructs. The results in Table 1 show that the square roots of the AVEs (diagonal elements) were greater than the corresponding inter-construct correlations, confirming adequate discriminant validity for the measurement model. Constructs exhibiting high collinearity, such as the correlation between digital maturity and employee performance, were excluded to ensure construct validity and internal consistency.

**Table 3:** Discriminant Validity Fornell–Larcker Criterion and Heterotrait Monotrait Ratios of Correlations

| Constructs                  | DM           | EP           | ET           | FP           | OE           |
|-----------------------------|--------------|--------------|--------------|--------------|--------------|
| Digital Maturity (DM)       | <b>0.915</b> | 0.913        | 0.065        | 0.798        | -0.130       |
| Employee Performance        | 0.810        | <b>0.918</b> | 0.073        | 0.760        | -0.037       |
| Emerging Technology (ET)    | 0.072        | 0.082        | <b>0.846</b> | -0.008       | -0.258       |
| Financial Performance (FP)  | 0.868        | 0.832        | 0.038        | <b>0.903</b> | -0.129       |
| Operational Efficiency (OE) | 0.154        | 0.130        | 0.228        | 0.169        | <b>0.757</b> |

### Assessment of Fitness of the Structural Equation Modeling (SME)

Table 4 presents the indices that assess the structural equation model. The

Chi-square indices, Structural Root Mean Square Residual (SRMR), and Normal Fit Index (NFI) for the saturated and estimated SEM models confirmed the

models' overall fit. The Structural Root Mean Square Residual (SRMR) for both the saturated and estimated models was well below 1. If the values exceed 1.96, the SEM could be a misfit (Jöreskog & Sörbom, 1989). According to Schermelleh-Engel et al. (2003), the chi-square test tests the null hypothesis that the differences between the elements of  $\Sigma$  (i.e., population covariance matrix) and  $\Sigma(\theta)$  (i.e., model-implied covariance matrix) are all zero:  $\Sigma - \Sigma(\theta) = 0$ .

Therefore, the Chi-square test confirmed that the structural equation model was a good fit for the data. The

model fitness of the SEM was assessed using the Normal Fit Index (NFI). Typically, the NFI ranges from 0 to 1, with values close to 1 indicating a good fit. Studies (Marsh & Grayson, 1995; Schumacker & Lomax, 1996) suggest that values of 0.9 or higher indicate a good fit for SEM at  $p \geq 0.05$ . From Table 4.27, the NFI values for the saturated and estimated models were 0.932 and 0.928, respectively, both within the standard range for a good fit. Thus, based on the NFI, the SME model showed a good fit, supporting the explanation for the results.

**Table 4:** Model Fit Indices of the Structural Equation Model

| Index      | Saturated Model | Estimated Model | Significance  | Interpretation |
|------------|-----------------|-----------------|---------------|----------------|
| SRMR       | 0.079           | 0.082           | $p \leq 0.05$ | Good fit       |
| Chi-square | 1085.658        | 1104.379        | $p \geq 0.05$ | Good fit       |
| NFI        | 0.932           | 0.928           | $p \geq 0.05$ | Good fit       |

### The Coefficient of Determination ( $R^2$ )

Table 5 summarizes the coefficients of determination ( $R^2$ ). The explanatory power was assessed using the coefficient of determination ( $R^2$ ). As shown in Table 5, the model explains a substantial proportion of the variance in

employee performance ( $R^2 = 0.835$ ) and financial performance ( $R^2 = 0.641$ ), indicating strong predictive power. In contrast, the explained variance for operational efficiency was relatively low ( $R^2 = 0.090$ ), suggesting that factors beyond emerging technologies and digital maturity may influence it.

**Table 5:** Coefficient of determination ( $R^2$ )

| Dependent variable     | $R^2$ | $R^2$ adjusted |
|------------------------|-------|----------------|
| Employee Performance   | 0.835 | 0.833          |
| Financial Performance  | 0.641 | 0.637          |
| Operational Efficiency | 0.090 | 0.079          |

### The Structural Model Results and Moderation Effect

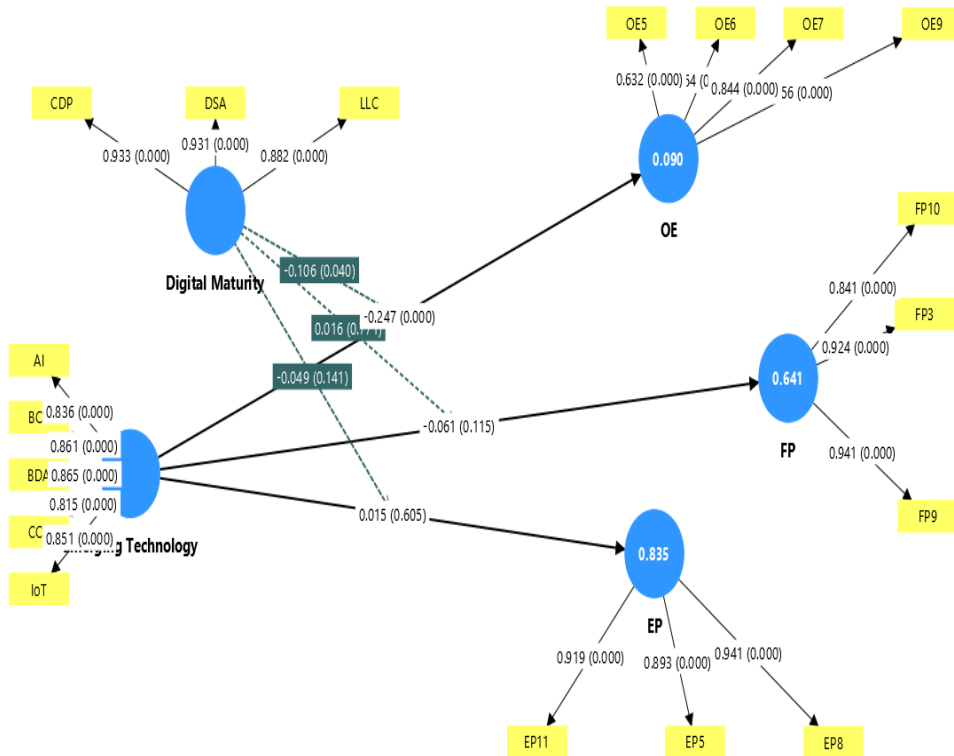
A structural model illustrating the moderating effect of digital maturity on the relationship between emerging technology adoption and performance outcomes is presented in Figure 4.8. The model reports standardized path coefficients, t-statistics, and effect sizes ( $f^2$ ), which were used to test the hypotheses. The results of the PLS-SEM analysis are presented in Table 4.

The direct effects indicate that digital maturity has a strong, statistically significant positive influence on employee performance ( $\beta = 0.904$ ,  $p < 0.001$ ) and financial performance ( $\beta = 0.805$ ,  $p < 0.001$ ). Conversely, digital maturity has a statistically significant adverse effect on operational efficiency ( $\beta = -0.130$ ,  $p < 0.01$ ), suggesting potential transitional

inefficiencies at higher levels of digital maturity.

Regarding the moderating effects, the interaction term between digital maturity and the adoption of emerging technologies was statistically significant only for operational efficiency ( $\beta = 0.106, p = 0.040$ ). This finding indicates that digital maturity strengthens

the relationship between emerging technologies and operational efficiency. However, the moderating effects of digital maturity on the relationships between emerging technology adoption and financial performance ( $\beta = 0.016, p = 0.771$ ) and employee performance ( $\beta = -0.049, p = 0.141$ ) were not statistically significant.



Digital Maturity (DM), Emerging Technology (EM), Employee Performance (EP), Financial Performance (FP), Operational Performance (OP)

**Figure 2:** Structural Model representing Moderating Effects of Digital Maturity on the relationship between Emerging Technologies and Performance in Five-Star Rated Hotels in Zanzibar.

The structural equation model used partial least squares (PLS) to generate results, which were then used to test the hypothesis. Using SEM, hypotheses are tested to accept or reject the null hypotheses about the moderating variable's effect on the relationship between the independent and dependent variables. The PLS-SEM

results used to test the hypotheses are presented in Table 5.

**Hypothesis H<sub>01</sub>**, which states that digital maturity does not moderate the relationship between the adoption of emerging technologies and operational efficiency, is supported by the results, which reveal a statistically significant moderating effect ( $p = 0.040$ ) (Table 6). Consequently, the null hypothesis was

rejected, and the alternative hypothesis  $H_1(i)$  was accepted, confirming that digital maturity significantly moderates the relationship between the adoption of emerging technologies and operational efficiency.

**Hypothesis  $H_{02}$** , which proposes that digital maturity does not moderate the relationship between the adoption of emerging technologies and financial performance, was supported. The interaction effect was not statistically significant, leading to the acceptance of the null hypothesis and rejection of the alternative hypothesis (Table 6). The null hypothesis was accepted, whereas the

alternative hypothesis, predicting the moderating variable's role, was rejected.

**Hypothesis  $H_{03}$** , which states that digital maturity does not moderate the relationship between emerging technology adoption and employee performance, is accepted in this study. The results indicate that while digital maturity directly influences employee performance, it does not significantly moderate the relationship between emerging technology adoption and employee performance. The null hypothesis was accepted, whereas the alternative hypothesis, which predicted a moderating effect of digital maturity, was rejected.

**Table 6:** Results of the Structural Equation Modeling

| Hypothes is   | Relation   | Path coefficient( $\beta$ ) | T statistics | P values     | F-Square     | Decision         |
|---------------|------------|-----------------------------|--------------|--------------|--------------|------------------|
|               | DM -> EP   | 0.904                       | 51.789       | 0.000        | 4.824        | Supported        |
|               | DM -> FP   | 0.805                       | 24.399       | 0.000        | 1.753        | Supported        |
|               | DM -> OE   | -0.130                      | 2.610        | 0.009        | 0.018        | Supported        |
|               | DM x ET -> |                             |              |              |              | Not              |
| $H_{04}(iii)$ | EP         | -0.049                      | 1.471        | 0.141        | 0.014        | Supported        |
|               | DM x ET -> |                             |              |              |              | Not              |
| $H_{04}(ii)$  | FP         | 0.016                       | 0.292        | 0.771        | 0.001        | Supported        |
|               | DM x ET -> |                             |              |              |              | Not              |
| $H_{04}(i)$   | OE         | <b>0.106</b>                | <b>2.052</b> | <b>0.040</b> | <b>0.012</b> | <b>Supported</b> |
|               | ET -> EP   | 0.015                       | 0.517        | 0.605        | 0.001        | Supported        |
|               | ET -> FP   | -0.061                      | 1.576        | 0.115        | 0.010        | Supported        |
|               | ET -> OE   | -0.247                      | 5.551        | 0.000        | 0.067        | Supported        |

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

*Digital Maturity (DM), Emerging Technology (EM), Employee Performance (EP), Financial Performance (FP), Operational Performance (OP)*

## Discussion of Findings

The findings indicate that digital maturity plays an important but selective role in explaining the relationship between the adoption of emerging technologies and performance outcomes in five-star-rated hotels in Zanzibar. The direct effects indicate that digital

maturity has a strong and significant influence on employee performance ( $\beta = 0.904$ ,  $t = 51.789$ ,  $p = 0.000$ ,  $f^2 = 4.824$ ) and financial performance ( $\beta = 0.805$ ,  $t = 24.399$ ,  $p = 0.000$ ,  $f^2 = 1.753$ ). These results suggest that digitally mature hotels are better positioned to coordinate technologies, integrate systems, develop employee competence,

protect data, and align digital initiatives with operational and business goals. This interpretation is consistent with Ka et al. (2023), who conceptualized digital maturity as the integration of business processes, digital technologies, digital capabilities, and strategic alignment, and with Sakhanova et al. (2025), who emphasized that digital maturity reflects the effective use of technology to create business and guest values.

The strong direct effects on employee and financial performance imply that digital maturity functions as an important organizational capability in its own right. Hotels with stronger digital strategies, better infrastructure, more capable employees, and more integrated processes are likely to improve staff productivity, service coordination, decision-making, and revenue-related outcomes, even before considering the interaction between digital maturity and technology adoption. In this sense, digital maturity does not simply describe the presence of digital tools; it reflects an organization's capacity to use them effectively.

However, the direct effect of digital maturity on operational efficiency was statistically significant and negative ( $\beta = -0.130$ ,  $t = 2.610$ ,  $p = 0.009$ ,  $f^2 = 0.018$ ). This finding differs from the broader expectation that digital maturity consistently improves operational outcomes. A plausible interpretation is that higher levels of digital maturity may initially entail operational adjustment costs as hotels redesign their workflows, train their staff, integrate systems, manage cyber security concerns, and coordinate new digital routines. This interpretation aligns with studies that identify implementation costs, infrastructure limitations, cybersecurity risks, resistance to change, regulatory gaps, and shortages of skilled personnel as constraints that may limit the

performance value of emerging technologies, particularly in hotels in developing nations (Banerjee & Bhat, 2024; Singh et, 2024; Jabbar et al., 2025; Irani al., 2024).

The context of Zanzibar helps describe this pattern. Five-star-rated hotels in Zanzibar operate within an island tourism destination, where performance may be shaped by international market dependence, reliance on digital booking channels, seasonal demand patterns, seasonal staffing, and differences in ownership or management structures across properties. In this context, technology adoption may generate operational complexity before it produces visible efficiency gains. For example, properties with international management or stronger corporate systems may integrate digital tools more smoothly than others do. In contrast, hotels with weaker local digital infrastructure, staff turnover, or limited system integration may experience temporary inefficiencies during implementation. Therefore, the observed negative direct effect on operational efficiency should be interpreted as a possible transition effect, rather than evidence that digital maturity is harmful.

The moderation results constitute the central contribution of this study to the existing literature. Digital maturity significantly moderated the relationship between the adoption of emerging technologies and operational efficiency ( $\beta = 0.106$ ,  $t = 2.052$ ,  $p = 0.040$ ,  $f^2 = 0.012$ ). Therefore, the null hypothesis was rejected, and the alternative hypothesis was accepted for operational efficiency. This indicates that digital maturity strengthens the relationship between the adoption of emerging technologies and operational efficiency in five-star-rated hotels in Zanzibar. In practical terms, hotels with stronger

infrastructure, clearer strategic alignment, stronger leadership commitment, higher digital competence, and more integrated processes can translate emerging technologies into operational improvements more effectively than others.

This finding should be understood in light of the four dimensions of digital maturity specified in the theoretical framework: strategy and organization, digital technology, digital capabilities, and integrated business processes. Although digital maturity was statistically tested as a single composite moderator, the construct represented the combined effects of these four interconnected dimensions. Treating digital maturity as a composite construct is theoretically appropriate because moderation is expected to occur through the overall maturity system rather than through its isolated dimensions. Strategy and organization provide direction and leadership commitment; digital technology provides infrastructure; digital capabilities provide human and technical competence; and integrated business processes ensure that technologies are embedded across hotel operations.

The significant moderating effect on operational efficiency suggests that digital maturity is complementary. While adopting emerging technologies can improve performance, digital maturity determines the absorptive capacity required to translate this potential into operational results. This complementarity is most evident in operational efficiency, as technology adoption often creates workflow complexity that requires coordination, process integration, staff competence, and managerial alignment. This finding is consistent with Ka et al. (2023), who emphasized that integrated business processes and strategic alignment are key components of maturity; Radović et al. (2025), who

linked maturity-related sociotechnical alignment to efficiency-driven satisfaction and loyalty outcomes; and Vo et al. (2024), who demonstrated that employees' digital skills moderate the effects of cloud accounting on job and operational performance in an emerging market.

In contrast, digital maturity does not significantly moderate the relationship between emerging technology adoption and financial performance ( $\beta = 0.016$ ,  $t = 0.292$ ,  $p = 0.771$ ,  $f^2 = 0.001$ ). Therefore, the null hypothesis was accepted, and the alternative hypothesis was rejected for financial performance. This finding differs from that of studies such as Sakhanova et al. (2025), which linked higher digitalization index scores to better revenue-per-room and occupancy outcomes. However, this result does not necessarily contradict the previous literature; rather, it suggests that financial outcomes may depend more strongly on market and strategic factors than on the interaction between technology adoption and digital maturity. In the context of Zanzibar's five-star-rated hotels, financial performance may be influenced by pricing strategy, market positioning, occupancy levels, international demand, seasonal tourism cycles, booking intermediaries, capital availability, and time required for digital investments to generate measurable returns. Therefore, even when a hotel is digitally mature, the financial value of emerging technologies may not be immediately apparent or may be mediated by external market conditions, such as the pandemic. This explains why digital maturity may directly support financial performance but fails to strengthen the relationship between technology adoption and financial performance outcomes. Similarly, digital maturity did not significantly moderate

the relationship between emerging technology adoption and employee performance ( $\beta = -0.049$ ,  $t = 1.471$ ,  $p = 0.141$ ,  $f^2 = 0.014$ ). Therefore, the null hypothesis was accepted, and the alternative hypothesis was rejected for the employee performance variable. This suggests that although digital maturity directly improves employee performance, it does not significantly alter the strength of the relationship between emerging technology adoption and employee performance. In other words, employee-related outcomes may be shaped more directly by digital skills, training, leadership support, work systems, and organizational culture than by the interaction between technology adoption and the organization's digital maturity.

This interpretation aligns with maturity-model arguments that digital capabilities can function as both direct organizational resources and enabling conditions, as suggested by Bititci et al. (2015) and Thordsen et al. (2020). For employee performance, the direct effect of capability appears dominant. Employees benefit from clear digital procedures, training, managerial support, and integrated work systems, regardless of whether digital maturity significantly modifies the effect of specific technology adoption on employee performance. This may be particularly relevant in Zanzibar's five-star-rated hotels, where seasonal staffing and variations in digital competence can make staff training and leadership support more influential than the adoption of any single emerging technology.

Synthesizing the findings, digital maturity plays a differentiated role in the performance outcomes. It directly enhances employee and financial performance, temporarily creates adjustment-related pressure on operational efficiency, and moderates the relationship between emerging

technology adoption and operational efficiency. Theoretically, this pattern suggests that digital maturity moderates the effects of technology adoption: it generates operational complexity that requires integration, but not when outcomes depend more on market factors, such as financial performance, or when direct capability effects dominate, such as employee performance.

## Conclusion

This study set out to test whether digital maturity amplifies the performance gains from adopting emerging technologies in five-star-rated hotels in Zanzibar, as predicted by the Digital Maturity Model. The results partially support this hypothesis. Digital maturity significantly moderates the relationship between emerging technology adoption and operational efficiency, but not the relationships with financial or employee performance. Moreover, digital maturity exerts a strong positive direct effect on employee and financial performance but a negative direct effect on operational efficiency. These findings do not invalidate the Digital Maturity Model; however, they specify its boundary conditions in developing-market luxury hospitality and challenge the assumption that digital maturity uniformly strengthens technology–performance linkages across all outcome dimensions.

This study examined the moderating role of digital maturity in the relationship between the adoption of emerging technologies and hotel performance, specifically operational, financial, and employee performance, in five-star-rated hotels in Zanzibar. The findings show that digital maturity has a strong, statistically significant, positive influence on employee and financial performance. Simultaneously, its direct effect on operational efficiency was

statistically significant but negative. The adoption of emerging technologies has a significant direct effect on operational efficiency. Most importantly, digital maturity significantly moderated only the relationship between the adoption of emerging technologies and operational efficiency. In contrast, its moderating effects on financial performance and employee performance were significant. Overall, this study concludes that digital maturity does not uniformly strengthen the effect of emerging technology adoption on hotel performance outcomes.

### Contribution of the Study

#### *Contextual / Geographical Contribution*

This study provides the first empirical test of digital maturity as a moderator of the technology–performance relationship in the hospitality industry. By focusing on five-star-rated hotels in Zanzibar, this study addresses a geographical gap in the digital transformation literature. This reveals that the model's logic of complementarity operates selectively in resource-constrained island tourism destinations. The findings suggest that context matters not only as a backdrop but also as a structural condition that shapes how organizational capabilities interact with technology investments.

This study contributes to the existing knowledge by providing context-specific evidence of the moderating role of digital maturity in the relationship between the adoption of emerging technologies and hotel performance in five-star-rated hotels in Zanzibar. By focusing on five-star-rated hotels in Zanzibar, this study addresses the contextual and geographical gaps in the literature. This study extends understanding of digital transformation and hotel performance in an under-

researched hospitality setting in a developing economy.

#### *Empirical Contribution*

This study demonstrates that the effects of digital maturity are dimension-specific in performance. The strong positive direct effects on employee performance ( $\beta = 0.904$ ,  $p < 0.001$ ,  $f^2 = 4.824$ ) and financial performance ( $\beta = 0.805$ ,  $p < 0.001$ ,  $f^2 = 1.753$ ) confirm that digitally mature hotels generate superior workforce and financial outcomes. However, the negative direct effect on operational efficiency ( $\beta = -0.130$ ,  $p = 0.009$ ,  $f^2 = 0.018$ ) and the negligible moderation effect on financial and employee performance ( $f^2 = 0.001$  and  $0.014$ , respectively) indicate that the model's predictions require qualification. Digital maturity does not automatically enhance all performance domains, nor does it invariably amplify the effects. This pattern challenges the assumption of uniform complementarity and highlights the need for dimensional and temporal specificity in maturity research.

Empirically, this study provides evidence from a developing tourism destination, demonstrating that digital maturity has strong positive direct effects on employee and financial performance. In contrast, its direct effect on operational efficiency is negative, suggesting that the benefits of digital maturity may vary across performance dimensions.

#### *Methodological Contribution*

This study demonstrates that the single-construct operationalization of digital maturity may obscure theoretically meaningful variations. Future research should employ second-order modeling or multidimensional indices to disentangle the specific mechanisms through which maturity components drive or moderate firm performance. Additionally, the

discrepancy between statistical and practical significance in the moderation results ( $f^2 = 0.012$  for operational efficiency) highlights the importance of reporting and interpreting effect sizes alongside p-values in hospitality management research.

Methodologically, this study contributes by applying PLS-SEM to examine a complex model with multiple constructs, performance outcomes, and moderating effects, and by confirming the construct reliability, validity, discriminant validity, and model fit.

### ***Theoretical Contribution***

The findings suggest that the Digital Maturity Model should be revised in three respects. First, its four dimensions, such as strategy and organization, digital technology, digital capabilities, and integrated business processes, may have differential effects on specific performance outcomes. Treating digital maturity as a single composite construct, as this study did, may mask dimension-specific mechanisms.

Second, the model should specify temporal phases that distinguish implementation-phase disruption from steady-state capability. The negative direct effect on operational efficiency likely reflects transitional friction as hotels integrate new systems, redesign their workflows, and retrain their staff. Third, the model's boundary conditions should include market development level, as the complementarity logic may hold for operational efficiency, where integration capability is key, but not for financial or employee performance, where market structure and direct capability effects may dominate.

### ***Practical Implication***

The findings yield contingent recommendations that vary according to

the performance objectives. For operational efficiency, hotel managers should prioritize integration capability over technology acquisition. Emerging technologies negatively affect operational efficiency when they are immature ( $\beta = -0.247$ ), and the positive moderation effect, though significant, was small in magnitude. This suggests that adopting technology without adequate readiness for integration disrupts workflows. Managers should sequence investments: build digital infrastructure, develop staff competence, and establish cross-departmental coordination before scaling technology deployment, and expect a transitional efficiency penalty.

For employee performance, the strong direct effect of digital maturity ( $\beta = 0.904$ ) indicates that workforce digital competence, leadership support, and strategic alignment improve employee outcomes, independently of technology adoption levels. Hotels should invest in training, mentorship, and flexible role design as direct human capital strategies rather than relying on assuming technology-mediated paths.

For financial performance, the strong direct effect of digital maturity ( $\beta = 0.805$ ) but absence of moderation suggests that financial returns depend on strategic alignment, revenue management capability, and market positioning rather than the interaction between technology and maturity. Managers should align digital strategies with pricing, distribution, and guest segmentation initiatives rather than expecting technology investments alone to drive profitability.

The negative direct effect of digital maturity on operational efficiency carries a specific warning: hotels pursuing rapid digital transformation may experience short-term operational frictions. Managers should monitor operational metrics during

implementation phases, avoid simultaneous multi-system rollouts, and design workflow redundancies that prevent service degradation during transitions in digital transformation, through digital strategy alignment, digital infrastructure readiness, employee digital competence, leadership/management literacy and commitment, and cybersecurity.

### **Policy implications**

Tourism authorities and policymakers in Zanzibar and comparable developing destinations should design targeted digital capability programs rather than generic technology adoption incentives. Given that digital maturity directly improves employee and financial performance but moderates only operational efficiency, policy support should prioritize: (a) workforce digital skills development through vocational training partnerships; (b) infrastructure reliability to reduce implementation friction; and (c) institutional frameworks for data protection and cybersecurity that build the governance dimension of maturity. Subsidies for technology acquisition without complementary capability building risk generating the negative operational efficiency effects observed in this study.

Policymakers and tourism authorities should support hotel digital transformation through programs that promote digital skills, reliable infrastructure, and institutional support for technology use in the hospitality industry sector.

### **Further Research**

Future researchers should examine other factors that may explain operational efficiency, given the relatively low variance explained for this outcome, and further investigate why digital maturity moderates operational

efficiency but not financial or employee performance in hotel settings.

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