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The moderating role of environmental turbulence in the relationship between technology orientation and performance of star-rated hotels in Kenya

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Abstract
The hospitality industry is increasingly characterized by rapid technological change, changing customer expectations, intensified competition and environmental uncertainty. Technology orientation has consequently become an important strategic capability through which hotels seek to improve operational efficiency, service delivery, customer experience and competitiveness. However, the performance value of technology orientation may depend on the external conditions under which hotels operate. This study examined the moderating role of environmental turbulence in the relationship between technology orientation and the performance of star-rated hotels in Nairobi City County, Kenya. The study adopted a positivist philosophy and a quantitative explanatory cross-sectional survey design. The target population comprised 600 managerial and strategic employees in 41 three-, four- and five-star hotels. Using Yamane's formula (Yamane, 1967), a sample of 240 respondents was selected through stratified random sampling. A total of 149 usable questionnaires were returned, giving a response rate of 62.1%. Data were collected using a structured five-point Likert-scale questionnaire and analyzed using descriptive statistics, Pearson correlation, multiple regression and hierarchical moderated regression. Technology orientation had a positive and statistically significant relationship with hotel performance (B = 0.193, beta = 0.201, t = 3.164, p = 0.002). Environmental turbulence also had a positive direct effect on hotel performance (B = 0.148, beta = 0.136, t = 3.020, p = 0.003). Most importantly, the Technology Orientation x Environmental Turbulence interaction was positive and statistically significant (B = 0.079, beta = 0.158, t = 2.257, p = 0.026). The explanatory power of the full moderation model increased from R2 = 0.481 to R2 = 0.534. The findings indicate that environmental turbulence strengthens the performance benefits associated with technology orientation. The study concludes that technology-oriented hotels are better positioned to respond to turbulent environments and recommends continued investment in digital infrastructure, technology skills and adaptive technological capabilities.

Keywords: Technology orientation, environmental turbulence, hotel performance, star-rated hotels, hospitality industry, Kenya

Introduction

Hotels operate in a business environment shaped by shifting customer preferences, technological change, competition, economic conditions and occasional external shocks. Hotel guests now expect convenient digital interactions, easy booking, flexible payment options and quick responses throughout the service experience. At the same time, hotels face increasing pressure to control costs, improve service quality and sustain competitiveness. Against this background, technology has moved beyond a support function and become part of the strategic way hotels compete and deliver services.

In this study, technology orientation reflects the extent to which a hotel commits itself to adopting, integrating and using technology in its operations and strategic activities. Technology-oriented organizations invest in technological capabilities to improve efficiency, innovation, information processing and customer value creation (Gatignon & Xuereb, 1997; Zhou *et al*., 2005) [12, 30]. In hotels, technology orientation may be reflected through digital reservation systems, electronic payment platforms, customer relationship management systems, mobile applications, data analytics, automated processes and other information and communication technologies.

Hospitality's continuing digital transformation has consequently made technology a strategic concern rather than a purely operational one. (Sigala, 2020) [23] The literature on digital business strategy similarly positions digital technologies as integral to organizational strategy and performance (Bharadwaj *et al*., 2013; Vial, 2019) [3, 28]. A systematic review of disruptive digital technologies in hotels found increasing attention to smart systems, information systems, e-business and emerging digital applications, including their implications for flexibility and innovation (Buhalis *et al*., 2022) [5]. Empirical evidence from a developing-country context also demonstrates that information technology adoption can contribute to hotel performance (Ezzaouiaa & Bulchand-Gidumal, 2023) [10]. Technology orientation therefore provides hotels with capabilities for improving service processes, supporting managerial decision-making and responding to customers more effectively.

Evidence from Kenya also indicates that technology orientation is relevant to hotel competitiveness. Ngari and Mwangi (2023) [19] found a significant relationship between technology orientation and sustained competitive advantage among star-rated hotels in Kenya. This article takes the analysis a step further by linking technology orientation to

hotel performance and asking whether the strength of that relationship changes when the external environment becomes more turbulent.

Environmental turbulence refers to the instability, unpredictability, complexity and rate of change in an organization's external environment (Dess & Beard, 1984; Duncan, 1972) [7, 9]. In hospitality, turbulence may be reflected in rapid changes in customer preferences, technological developments, competitive intensity, tourism demand, economic conditions and regulatory requirements. Hotels operating in such environments cannot rely solely on established routines. This is consistent with research emphasizing dynamic and technology-enabled capabilities in hospitality (Ivanov & Webster, 2021; Park & Lee, 2023) [16, 20]. They require capabilities that enable them to sense changes, seize opportunities and reconfigure resources as conditions evolve (Teece, 2007) [25].

The COVID-19 period demonstrated the strategic importance of adaptability in hospitality. The sector experienced abrupt changes in travel demand, service processes and customer expectations, accelerating the use of contactless services and digital customer engagement. Such developments illustrate why technology may have greater strategic value when environmental conditions are uncertain. Technology can facilitate information processing, service flexibility, remote engagement, operational automation and rapid adaptation. However, the effectiveness of technology investment is likely to depend on how well technological resources fit environmental requirements.

Contingency Theory provides a basis for this argument by proposing that organizational effectiveness depends on the fit between organizational characteristics and environmental conditions (Lawrence & Lorsch, 1967; Donaldson, 2001) [8, 18]. From a resource-based perspective, capabilities can also contribute to sustained advantage when they provide value and are not readily substituted or replicated (Barney, 1991) [1]. Dynamic Capabilities Theory complements this perspective by emphasizing the ability of firms to integrate, build and reconfigure competencies in response to changing environments (Teece, Pisano, & Shuen, 1997; Teece, 2007) [25, 26]. From these perspectives, technology orientation should not be expected to have a uniform effect on performance under all environmental conditions. Rather, its contribution may become stronger where environmental turbulence increases the need for flexibility and rapid response.

Despite increasing research on digital transformation and technology adoption in hospitality, there remains limited empirical evidence on the moderating role of environmental turbulence in the technology orientation-performance relationship among star-rated hotels in Kenya. Existing research has often emphasized direct effects of technology adoption or strategic orientation on hotel outcomes. The current study addresses this gap by examining whether environmental turbulence changes the strength of the relationship between technology orientation and performance among three-, four- and five-star hotels in Nairobi City County.

The analysis therefore sought to establish whether environmental turbulence changes the relationship between technology orientation and the performance of star-rated hotels in Nairobi, Kenya. By testing the interaction between an internal capability and an external condition, the study adds a contextual explanation of when technology orientation is more strongly associated with hotel performance.

Literature Review

1. Technology Orientation

Technology orientation captures a hotel's readiness and commitment to adopt and integrate technological innovations into its operations. Gatignon and Xuereb (1997) [12] associated technology orientation with an organizational emphasis on technological capability and innovation, while Zhou *et al*. (2005) [30] connected strategic orientations with breakthrough innovation and performance. Technology orientation is therefore broader than possession of technology; it encompasses managerial commitment to technological adoption, infrastructure, integration and employee capability.

In the hotel industry, technology orientation can affect performance through several pathways. Digital systems can automate routine activities and improve process efficiency; technology can improve information availability and managerial decision-making; digital platforms can strengthen customer engagement; and data analytics can enable hotels to respond more rapidly to changes in demand and customer behavior.

The increasing use of disruptive digital technologies has changed the nature of hotel competition. Smart-hospitality research similarly emphasizes interconnectivity and interoperability among hotel technologies and service systems (Buhalis & Leung, 2018) [4]. Digital platforms have reduced information asymmetry between customers and hotels, increased price transparency and made online reviews more influential in purchase decisions. The growth of alternative digital accommodation platforms has also altered the competitive structure of tourism accommodation (Guttentag, 2015) [13]. Hotels therefore need technological capabilities not only to reduce operating costs but also to manage customer relationships and compete in digitally mediated markets.

Technology orientation does not, however, guarantee superior performance. The value of technological investments may depend on organizational readiness, employee skills, process integration, leadership support and environmental conditions. Digital investments that are poorly integrated into operations may create additional costs or fail to produce expected benefits. This supports the argument that the technology orientation-performance relationship should be studied within a broader organizational and environmental context.

2. Hotel Performance

Hotel performance is multidimensional and includes both financial and non-financial outcomes. Venkatraman and Ramanujam (1986) [27] distinguish financial performance from broader organizational performance, while Kaplan and Norton (1992) [17] argue that organizational performance should incorporate financial outcomes, customer outcomes, internal processes, and learning and growth. In hospitality research, performance may therefore include profitability, revenue growth, occupancy, customer satisfaction, operational efficiency, competitiveness and customer retention.

For this study, hotel performance was assessed through profitability growth, customer satisfaction, operational efficiency and market competitiveness. This multidimensional approach is appropriate because technology can affect hotel performance through several mechanisms simultaneously.

3. Environmental Turbulence

Environmental turbulence refers here to the pace, uncertainty and unpredictability with which conditions outside the hotel change. The construct has roots in organizational environment research and has been linked to uncertainty, dynamism, competitive intensity and technological change (Duncan, 1972; Dess & Beard, 1984) [7, 9]. Jaworski and Kohli (1993) further demonstrated that environmental conditions influence the way firms respond to markets and competitors.

For hotels, environmental turbulence may arise from customer preference instability, unpredictable competition, rapid technological change and unpredictable market trends. The tourism and hospitality industry is particularly exposed because demand can change quickly in response to economic conditions, political developments, health crises, technological disruption and changing travel preferences.

Environmental turbulence can have both negative and positive strategic implications. Uncertainty can increase costs, disrupt demand and make planning difficult. At the same time, turbulence can create opportunities for organizations with strong adaptive capabilities. Technology orientation may be particularly valuable in such settings because digital systems can improve information processing, coordination, service flexibility and response speed.

4. Theoretical Framework

1. Dynamic Capabilities Theory

Dynamic Capabilities Theory explains how organizations sustain performance in changing environments by sensing opportunities and threats, seizing opportunities and reconfiguring resources and capabilities (Teece *et al*., 1997; Teece, 2007) [25, 26]. The theory is directly relevant to technology orientation because technological capabilities can help hotels detect changes in customer behavior, process information rapidly, introduce new service processes and reconfigure operations. In a turbulent environment, technology may therefore function as an adaptive capability rather than simply as an efficiency tool.

The theory predicts that firms with stronger capabilities for adaptation should be better able to transform technological resources into performance outcomes when environmental change is high. This provides a theoretical basis for expecting environmental turbulence to strengthen the technology orientation-performance relationship.

2. Contingency Theory

Contingency Theory proposes that organizational effectiveness depends on the fit between organizational strategies and contextual conditions (Lawrence & Lorsch, 1967; Donaldson, 2001) [8, 18]. There is therefore no single strategy that is universally optimal. The performance consequences of technology orientation may depend on whether the external environment is relatively stable or turbulent. In stable conditions, technology may generate efficiency gains through routine automation. Under high turbulence, technology may become more valuable because it enables faster adaptation, information processing and customer responsiveness.

Contingency Theory therefore provides the central rationale for positioning environmental turbulence as a moderator. The theory suggests that the same level of technology orientation may produce different performance outcomes depending on the environmental context in which the hotel operates.

5. Empirical Review and Research Gap

Empirical evidence generally supports a positive relationship between technology adoption and organizational performance. Research on hotel information technology has linked adoption to improved operational processes and performance outcomes, while recent systematic reviews show increasing attention to digital technologies, smart systems and technology-enabled service innovation in hospitality (Buhalis *et al*., 2022 [5]; Ezzaouiaa & Bulchand-Gidumal, 2023) [10]. Research on technology orientation in Kenyan star-rated hotels also indicates its importance for competitive advantage (Ngari & Mwangi, 2023) [19].

However, the existing evidence is dominated by direct-effect models. A direct relationship does not explain whether the benefits of technology orientation remain constant when external conditions change. The hospitality sector's exposure to environmental volatility makes this omission important. The current study therefore treats environmental turbulence as a boundary condition and tests the interaction directly.

The research gap has three related dimensions. First, much of the available evidence originates outside Kenya. Second, studies of technology orientation do not always account for the external setting in which the capability is deployed. Third, relatively little empirical work directly tests environmental turbulence as a moderator in Nairobi's star-rated hotel sector.

6. Conceptual Framework

The conceptual model proposes that Technology Orientation is the independent variable, Hotel Performance is the dependent variable, and Environmental Turbulence is the moderating variable. Technology Orientation was operationalized through adoption of new technology, integration of digital systems, ICT infrastructure investment and employee ICT training. Environmental Turbulence was operationalized through customer preference instability, competitive intensity and unpredictability, rapid technological changes and market trend unpredictability. Hotel Performance was assessed through profitability growth, customer satisfaction, operational efficiency and market competitiveness.

The proposed relationship is: Technology Orientation -> Hotel Performance, with Environmental Turbulence moderating the strength of this relationship.

Environmental Turbulence

Performance of Star-rated Hotels

Technology Orientation

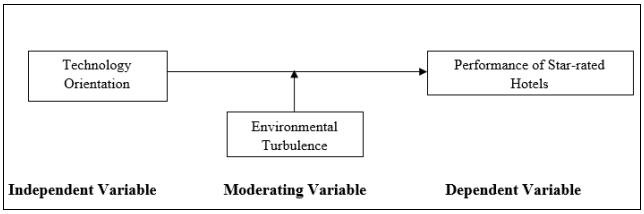

Fig 1: Conceptual framework

7. Research Hypotheses

$H0_1$: There is no statistically significant relationship between technology orientation and the performance of star-rated hotels in Nairobi, Kenya.

$H0_2$: Environmental turbulence does not have a statistically significant moderating effect on the relationship between technology orientation and the performance of star-rated hotels in Nairobi, Kenya.

Methodology

1. Research Philosophy and Design

The investigation was grounded in positivism and used a quantitative explanatory design. (Saunders *et al*., 2019) [22] This approach allowed the study constructs to be represented by measurable indicators and the proposed relationships to be evaluated statistically. Information was gathered from hotel managers through a cross-sectional survey conducted at one point in time. The design was appropriate for examining relationships among technology orientation, environmental turbulence and hotel performance across multiple hotel establishments.

2. Study Population and Unit of Analysis

The study covered 41 star-rated hotels in Nairobi City County: nine three-star, eight four-star and 24 five-star properties. Approximately 600 managers and other strategic-level employees constituted the target population. The hotel was the unit of analysis because technology orientation and organizational performance are organizational-level constructs, while managers constituted the unit of observation. Respondents included general managers, operations managers, human resource managers, marketing and sales managers, finance/accounts managers, food and beverage managers, front office managers and housekeeping managers.

3. Sampling and Sample Size

With N = 600 and an allowable error of 5%, the sample size was calculated as 240 using Yamane's formula, $n = N/ [1 + N(e^2)]$ (Yamane, 1967) [29]. Stratification by hotel category was then used to preserve representation of the three-, four- and five-star groups. The planned sample consisted of 53 respondents from three-star hotels, 47 from four-star hotels and 140 from five-star hotels. Within the hotels, eligible managers were selected randomly from key functional positions.

Hotel category	Hotels	Population	Planned sample	Usable responses	Response rate
3-star	9	120	53	32	60.4%
4-star	8	110	47	30	63.8%
5-star	24	370	140	87	62.1%
Total	41	600	240	149	62.1%

4. Instrument and Measurement

Measurement items were drawn from the relevant strategic-management and hospitality literature and organized into a structured questionnaire. Responses were recorded on a five-point Likert scale. Technology Orientation was measured using five items addressing adoption of new technology, integration of digital systems, ICT infrastructure investment and employee ICT training. Environmental Turbulence was measured using five items addressing changes in customer preferences, competitive unpredictability, technological change and market trend unpredictability. Hotel Performance was measured using five items covering profitability growth, customer satisfaction, operational efficiency and market competitiveness.

5. Validity and Reliability

Content validity was assessed through expert input and a pilot exercise. The pilot involved 24 respondents, equivalent to about 10% of the intended sample, and was conducted outside the study hotels. It was used to identify problems with clarity, understanding and internal consistency before the main survey. The main-study reliability results were satisfactory, with all Cronbach's alpha coefficients exceeding the commonly accepted 0.70 threshold. The 0.70 benchmark is consistent with commonly used reliability guidance in multivariate research (Hair *et al*., 2019) [14].

Construct	Items	Cronbach's alpha
Technology Orientation	5	0.852
Environmental Turbulence	5	0.801
Hotel Performance	5	0.865

The thesis also reports diagnostic procedures covering validity, normality, multicollinearity, homoscedasticity, autocorrelation and linearity. These procedures were undertaken before inferential analysis to assess the suitability of the data for regression and moderation analysis.

6. Data Collection and Ethics

Ethical clearance was obtained from the relevant university ethics committee and institutional authorization was sought from participating hotels. Questionnaires were administered electronically and physically according to respondent preference and accessibility. Participation was voluntary, informed consent was obtained, and respondents were informed of their right to withdraw. Questionnaires were anonymized and no personal identifiers were collected. Data were coded and analyzed without identifying individual respondents or specific hotel identities.

7. Data Analysis

Responses were coded and processed in SPSS Version 28. (Field, 2018) [11] Means and standard deviations were used to summarize the variables, while Pearson's correlation coefficient assessed the direction and strength of their linear associations. Regression analysis was used for the direct-effect assessment, followed by hierarchical regression to evaluate whether Environmental Turbulence changed the Technology Orientation–Hotel Performance relationship. Moderation was interpreted as a change in the strength of the relationship associated with the interaction term, consistent with established moderation analysis (Baron &

Kenny, 1986; Hayes, 2018) [2, 15]. The moderation model included the other strategic orientation variables and their corresponding interaction terms, consistent with the original thesis analytical framework.

8. Model Specification

The direct-effects model was specified as:

$HP = \beta0 + \beta1CO + \beta2SDO + \beta3MO + \beta4TO + \varepsilon$

where HP = Hotel Performance; CO = Cost Orientation; SDO = Service Differentiation Orientation; MO = Market Orientation; TO = Technology Orientation; β0 = constant; β1–β4 = regression coefficients; and ε = error term.

The moderation model was specified as:

$HP = \beta0 + \beta1CO + \beta2SDO + \beta3MO + \beta4TO + \beta5ET + \beta6(CO \times ET) + \beta7(SDO \times ET) + \beta8(MO \times ET) + \beta9(TO \times ET) + \varepsilon$

where ET = Environmental Turbulence. The coefficient of the Technology Orientation × Environmental Turbulence interaction was used to determine whether environmental turbulence significantly changed the technology orientation-performance relationship. A statistically significant interaction term at $p < 0.05$ was interpreted as evidence of moderation.

Results and Discussion

1. Response Rate

Of the 240 questionnaires issued to the selected respondents, 149 were sufficiently complete for analysis. This yielded a 62.1% usable response rate and provided observations from each of the three hotel categories included in the study.

2. Descriptive Statistics

Variable	N	Mean	SD	Minimum	Maximum
Technology Orientation	149	3.43	0.38	2.55	4.28
Environmental Turbulence	149	3.29	0.51	1.95	4.59
Hotel Performance	149	3.47	0.51	2.20	4.80

Technology Orientation recorded a mean of 3.43 (SD = 0.38), indicating moderately high adoption of technology-oriented practices. Environmental Turbulence had a mean of 3.29 (SD = 0.51), suggesting that respondents perceived their operating environment as moderately dynamic and uncertain. Hotel Performance recorded a mean of 3.47 (SD = 0.51), indicating generally favorable perceived performance outcomes.

3. Correlation Analysis

Variable	Technology Orientation	Environmental Turbulence	Hotel Performance
Technology Orientation	1.000	—	0.474
Environmental Turbulence	—	1.000	0.389
Hotel Performance	0.474	0.389	1.000

The correlation matrix showed a positive, moderate association between Technology Orientation and Hotel Performance (r = 0.474). Environmental Turbulence was also positively related to Hotel Performance (r = 0.389). The positive correlation between technology orientation and performance provides preliminary support for the direct-effect hypothesis, while the relationship involving environmental turbulence indicates that environmental conditions are relevant to hotel performance. Correlation alone, however, cannot establish moderation; hence the interaction model was tested through hierarchical regression.

4. Technology Orientation and Hotel Performance

The bivariate analysis indicated a moderate positive association between Technology Orientation and Hotel Performance (r = .474). In the regression estimates, the Technology Orientation coefficient was positive and statistically significant (B = 0.193, β = 0.201, t = 3.164, p = 0.002). Because this coefficient was estimated within the broader thesis regression specification, it is reported here as the Technology Orientation effect while the other strategic-orientation coefficients are omitted from this article.

This pattern suggests that hotels with stronger technology adoption, digital integration, ICT infrastructure and technological capability tend to report better performance. The evidence therefore led to rejection of H_{01}.

4.1: Technology Orientation Regression Coefficient

Variable	B	β	t	p
Technology Orientation	0.193	0.201	3.164	0.002

5. Moderating Effect of Environmental Turbulence

The moderation test was based on hierarchical regression, with particular attention to the interaction between Technology Orientation and Environmental Turbulence. This interaction determines whether the technology–performance association varies with environmental conditions. The procedure follows established moderation-analysis guidance (Hayes, 2018) [15].

The interaction term was positive and statistically significant (B = 0.079, β = 0.158, t = 2.257, p = 0.026). The result indicates that Environmental Turbulence significantly changes the strength of the Technology Orientation–Hotel Performance relationship.

The estimated moderation specification included the broader strategic-orientation controls reported in the underlying analysis. Because this article is focused on Technology Orientation, those additional coefficients are not reproduced in the article. The reported R^2 values of 0.481 and 0.534 belong to the broader regression models and are therefore not presented here as Technology-Only R^2 values.

5.1: Technology Orientation × Environmental Turbulence Interaction

Interaction	B	β	t	p
Technology Orientation × Environmental Turbulence	0.079	0.158	2.257	0.026

6. Moderation Regression Coefficients

The direct coefficient for Environmental Turbulence was positive and significant (B = 0.148, β = 0.136, t = 3.020, p = 0.003). The central moderation coefficient was also positive and significant: Technology Orientation × Environmental Turbulence, B = 0.079, β = 0.158, t = 2.257, p = 0.026. The positive interaction indicates that the relationship between

Technology Orientation and Hotel Performance becomes stronger as Environmental Turbulence increases.

The moderation hypothesis is therefore supported. The evidence suggests that the contribution of Technology Orientation becomes more pronounced when the external environment is more dynamic and uncertain, which accords with the logic of Contingency Theory and Dynamic Capabilities Theory.

6.1 : Environmental Turbulence Direct Effect

Effect	B	β	t	p
Environmental Turbulence → Hotel Performance	0.148	0.136	3.020	0.003

7. Hypothesis Testing

Hypothesis	Result	Decision
$H0_1$: Technology Orientation has no significant relationship with Hotel Performance.	β = 0.201, p = 0.002	Rejected
$H0_2$: Environmental Turbulence does not significantly moderate the Technology Orientation–Hotel Performance relationship.	β = 0.158, p = 0.026	Rejected

The two null hypotheses were rejected. The direct-effect result supports a significant Technology Orientation–Hotel Performance relationship, while the positive interaction indicates that Environmental Turbulence strengthens that relationship within the sampled hotels.

Discussion

1. Technology Orientation and Hotel Performance

The regression evidence points to technology as a strategically relevant resource for the sampled hotels. Properties that develop their technology adoption, integrate digital systems, strengthen ICT infrastructure and build employee ICT capability appear better placed to achieve favorable performance outcomes. This result is in line with the argument that technology enables organizations to improve efficiency and service innovation (Gatignon & Xuereb, 1997; Zhou *et al*., 2005) [12, 30].

The result also aligns with recent hospitality research emphasizing digital transformation as a driver of service innovation and operational flexibility. The systematic review by Buhalis *et al*. (2022) [5] identifies a growing body of research on disruptive technologies in hotels, while Ezzaouiaa and Bulchand-Gidumal (2023) [10] provide evidence that information technology adoption can influence hotel performance in a developing-country context. The Kenyan finding is also consistent with Ngari and Mwangi (2023) [19], who reported a significant technology orientation-competitive advantage relationship among star-rated hotels in Kenya.

From a management perspective, the result is important. Technology investment should not be evaluated solely in terms of the acquisition of hardware or software. Hotels should consider technology as an organizational capability requiring integration with processes, employee skills and strategic objectives. A property management system, digital reservation platform or analytics tool creates value only when employees can use it effectively and when the technology is integrated into decision-making and service delivery.

2. Environmental Turbulence as a Moderator

The interaction term provides the central empirical contribution of the study. It indicates that the performance relevance of Technology Orientation is greater when hotels face more turbulent operating conditions. This supports the contingency logic that organizational strategies cannot be evaluated independently of the environments in which they are implemented.

The finding also provides empirical support for Dynamic Capabilities Theory. In turbulent settings, hotels need to identify changes rapidly, respond to emerging customer expectations and reconfigure operational processes. Technology can facilitate these capabilities by providing timely information, automating processes, supporting digital customer engagement and enabling flexible service delivery. The interaction result therefore suggests that technology orientation may function as a dynamic capability whose performance value increases as the need for adaptation increases.

This result cautions against viewing technology investment as automatically beneficial regardless of context. Its value appears conditional on the operating environment. Under relatively stable conditions, technology may mainly yield incremental efficiency improvements; when conditions become turbulent, the same technological capabilities can assist responsiveness, resilience and operational adaptation.

3. Contribution to Knowledge

The findings add to the literature in three main respects. First, it provides empirical evidence from Nairobi's star-rated hotel sector that technology orientation is positively associated with hotel performance. Second, it extends the strategic orientation literature by treating environmental turbulence as a boundary condition rather than merely a background characteristic. Third, it integrates Contingency Theory and Dynamic Capabilities Theory to explain why technology orientation becomes more valuable when hotels face higher environmental change and uncertainty.

The study also contributes context-specific evidence from an emerging hospitality market. Research on digital transformation has expanded globally, but evidence from African hotel markets remains comparatively limited. By focusing on three-, four- and five-star hotels in Nairobi, the study provides evidence relevant to a structured and competitive hospitality segment in Kenya.

Conclusion

In summary, the results support a positive Technology Orientation–Hotel Performance relationship among Nairobi's star-rated hotels. Technology adoption, integration of digital systems, ICT infrastructure investment and employee capability in using technology are all relevant aspects of this relationship.

The findings further show that Environmental Turbulence modifies the Technology Orientation–Hotel Performance relationship. The positive interaction suggests that the performance contribution of technology orientation becomes stronger as turbulence rises. Environmental change should therefore be viewed not only as a source of risk but also as a condition that can increase the strategic value of adaptive technological capability. also increases the strategic value of technological capabilities that enable hotels to respond rapidly and flexibly.

The findings support the view that hotel performance depends not only on the resources and strategies possessed by a hotel but also on the fit between those capabilities and the external environment. For Nairobi's star-rated hotels, technological capability should consequently be developed as an adaptive strategic resource rather than treated as a stand-alone operational investment.

Recommendations

Hotel managers should first position technology orientation as a strategic capability and ensure that technology spending is tied directly to organizational objectives. Investment decisions should prioritize technologies that directly improve customer experience, operational efficiency, information availability and responsiveness.

A second priority is to strengthen the digital infrastructure supporting hotel operations. This includes integrated property-management and reservation systems, electronic payment channels, customer-management applications, analytics and suitable automation. Integration should be emphasized because fragmented systems may limit the benefits of individual technologies.

Third, management should build employee ICT competence. The study's technology-orientation measure includes staff technology training, and digital investments are unlikely to deliver their full value unless employees can use the systems effectively. Continuous training should therefore accompany major technology investments.

Fourth, hotels should make environmental scanning a routine management activity. Since turbulence strengthens the technology–performance relationship, managers should monitor customer expectations, competitor actions, technological developments and market movements and use that information when making technology decisions. logypriorities.

Finally, technology strategies should allow room for adjustment. Hotels should favor scalable and interoperable systems that can be expanded or modified as market conditions and guest expectations evolve rather than relying on inflexible platforms.

Limitations and Areas for Further Research

Because the research used a cross-sectional design, it cannot fully capture changes over time or establish long-term causal effects. Future studies could use longitudinal designs to examine whether changes in environmental turbulence lead to corresponding changes in the performance value of technology orientation over time. Such designs would also help address the temporal limitations associated with cross-sectional research (Creswell & Creswell, 2018) [6].

The analysis was based on managers' questionnaire responses. Managers are relevant informants because they participate in strategic and performance decisions, but subsequent studies could strengthen the evidence by combining their assessments with objective measures such as occupancy, RevPAR, revenue growth and recorded customer-satisfaction data.

The geographical scope was limited to star-rated hotels in Nairobi City County. Future research could test the model in other Kenyan counties, hotel categories and hospitality businesses such as resorts, restaurants and serviced apartments. Comparative studies could also examine whether the moderating effect differs between three-, four- and five-star hotels.

Future research could also examine other moderators and mediators, including organizational digital maturity, employee technology competence, organizational culture, innovation capability and leadership. Such studies would provide a more comprehensive explanation of how technology orientation translates into hotel performance under changing environmental conditions.

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