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Information technology as a determinant of organisational performance in the context of the hotel industry: is there anything in between?

Adriana L Fernandes[1,2], Bráulio Alturas[1] and Daysa Andrade Oliveira[3]

Abstract

This study addresses the ongoing debate on whether Information Technology (IT) alone can enhance hotel performance by examining its role in combination with internal organisational resources. Although prior research has explored the link between IT and performance, findings remain inconsistent, with some studies showing positive impacts while others highlight limited or no effects. This indicates a gap in understanding the mechanisms through which IT generates sustainable competitive advantage in the hospitality industry. Grounded in the Resource-Based View (RBV), this study proposes and tests a comprehensive model that integrates IT with Organisational Learning (OL) and Organisational Culture (OC) to explain how these intangible resources interact to influence hotel performance. Data were collected through a survey of 295 hotel professionals in Brazil and Portugal between 2016 and 2017, and the proposed model was tested using Structural Equation Modelling (AMOS 23.0). The results reveal that IT has both direct and indirect effects on performance, with OL playing a partial mediating role. OC positively influences IT and OL but impacts performance only indirectly, through OL. These findings demonstrate that IT alone does not guarantee performance improvement; its value depends on its alignment with other organisational resources. This study contributes to the literature by empirically linking IT, OC, and OL in a single model, providing a nuanced understanding of how technology, culture, and learning complement each other to drive performance. For practitioners, the findings offer guidance on how to strategically integrate IT initiatives with organisational capabilities to achieve sustainable competitive advantage.

Keywords

information technology, organisational learning, organisational culture, hotel performance, hospitality

Introduction

The hotel industry operates in an increasingly technology-intensive competitive environment, in which IT has become a strategic priority for improving operational efficiency, enhancing the guest experience, and sustaining long-term competitiveness (Bilgihan et al., 2015; Gutierriz et al., 2025; Hernandez and Lee, 2025; Iranmanesh et al., 2022; Kandampully et al., 2016). Yet decades of empirical research reveal a persistent paradox: despite substantial IT investments, performance outcomes remain inconsistent (Bulchand-Gidumal and Melián-González, 2011; Mithas and Rust, 2016; Powell and Dent-Micallef, 1997; Solow, 1987; Tippins and Sohi, 2003). This productivity paradox has been attributed primarily to the commodity nature of IT — since the same technology can be acquired and replicated by competing firms, it is insufficient, in isolation, to generate sustained competitive advantage (Barney, 1991, 1995;

[1]ISTAR-Iscte, Instituto Universitário de Lisboa (ISCTE-IUL), Lisboa, Portugal
[2]Department of Maritime Engineering, Escola Superior Nautica Infante D Henrique, Paço de Arcos, Portugal
[3]Administration Department, Antônio Eufrásio de Toledo University Center, Presidente Prudente, São Paulo, Brazil

Corresponding author:
Bráulio Alturas, Instituto Universitário de Lisboa (ISCTE-IUL), ISTAR-Iscte (University Institute of Lisbon), Av. das Forças Armadas, 40, Lisboa 1649-026, Portugal.
Email: braulio.alturas@iscte-iul.pt

Cheng et al., 2023). The strategic challenge, as Cohen and Olsen (2013) and Melián-González and Bulchand-Gidumal (2016) argue, lies in understanding how IT, in combination with complementary internal organisational resources, generates performance outcomes that competitors cannot easily imitate.

This challenge is best examined within the framework of the Resource-Based View (RBV) (Barney, 1991), which holds that firms compete on the basis of resources that are heterogeneously distributed, with competitive advantage derived from internal organisational resources that are rare, valuable, and difficult to imitate. According to RBV, IT alone cannot generate a sustainable competitive advantage; it can improve efficiency, but the same IT can be adopted by competing firms (Barney, 1995; Bulchand-Gidumal and Melián-González, 2011; Real et al., 2006; Tippins and Sohi, 2003). The advantages generated by IT can be protected when it is incorporated into an organization through complementarity, which occurs when the value of one resource is enhanced by the presence of another unique organisational resource, preventing competitors from benefiting from imitation (Powell and Dent-Micallef, 1997; Real et al., 2006; Tippins and Sohi, 2003).

To understand the influence that IT has on organisational variables, it is necessary to consider more than just IT objects — hardware, software, and applications (Bulchand-Gidumal and Melián-González, 2011; Cheng et al., 2023; Real et al., 2006). It is important to understand how these IT objects are used to manage information within the company and whether organisational players dominate them as working tools. IT is therefore conceptualised in this study as an organisational capability, defined as "the extent to which a firm is knowledgeable about its hardware and effectively utilizes IT to manage information within the firm" (Tippins and Sohi, 2003: 4), rather than merely as a technological asset.

A particularly underexplored complementary resource in the hospitality IT literature is Organisational Culture (OC). Understood as the shared values, beliefs, and underlying assumptions among organisational members (Cameron and Quinn, 1999; Sanz-Valle et al., 2011), OC shapes the conditions under which IT is effectively implemented and under which learning processes are activated (Leidner and Kayworth, 2006). While OC has been broadly recognised as a critical enabler of IT adoption and knowledge creation, its role within integrated IT–performance models in the hotel sector remains empirically underdeveloped (Kandampully et al., 2016). This study addresses that gap by operationalising OC not as a simple direct antecedent of performance but as a multifunctional resource — simultaneously influencing IT adoption, OL development, and potentially moderating the relationship between them — a theoretical distinction that prior empirical work has not fully tested.

While a significant body of research has examined individual pairwise relationships — IT–performance, IT–OL, or OC–IT — the existing literature does not address the dynamics of all three resources operating simultaneously within a single integrated framework, particularly in the hotel sector (Iranmanesh et al., 2022; Lee et al., 2021). Studies have tended to examine these constructs in isolation or in pairs, leaving the simultaneous interaction effects between IT, OL, and OC relatively underexplored. This gap motivates the present research.

Against this background, this study makes four specific contributions to the literature on IT and hotel performance.

First, it proposes and empirically tests a dual-pathway model in which IT generates performance outcomes both directly and indirectly via OL. The coexistence of these two pathways is theoretically grounded in the RBV distinction between temporary competitive advantage — reflecting the current heterogeneous distribution of IT across hotel firms — and sustained competitive advantage, which emerges when IT is combined with complementary organisational capabilities. Building on the foundational work of Tippins and Sohi (2003) and Real et al. (2006), this contribution demonstrates that IT's value is not exhausted by its indirect pathway, extending more recent hospitality evidence (Ezzaouia and Bulchand-Gidumal, 2023; Hernandez and Lee, 2025) by situating the direct effect within an explicit theoretical framework.

Second, it operationalises OC as a multifunctional resource within an integrated IT–performance framework. OC is examined simultaneously as an antecedent of IT adoption, an antecedent of OL, allowing its multifunctional role within the model to be empirically assessed. The finding that IT partially mediates the OC–OL relationship indicates that culture's influence on learning is partly channelled through the technological infrastructure that a supportive culture helps put in place. This contributes to a more nuanced understanding of the mechanism linking cultural values to learning outcomes, an area that has received limited empirical attention in the hospitality literature.

Third, whereas prior hospitality research has typically examined the IT–OL–performance chain or the OC–IT relationship in separate studies, this paper tests the full three-resource framework simultaneously using Structural Equation Modelling (SEM). This integrated approach reveals interaction effects and mediating pathways that pairwise analyses cannot detect, providing a more integrated account of how IT creates

value in hotel settings (Cohen and Olsen, 2013; Melián-González and Bulchand-Gidumal, 2016).

Fourth, the study draws on a sample spanning two Lusophone hotel markets — Portugal and Brazil — with distinct levels of IT maturity, institutional contexts, and cultural profiles. Rather than a formal cross-national comparative analysis, this dual-country sampling strategy broadens the geographical scope of the evidence beyond the single-country designs that dominate the hospitality IT literature, and provides a foundation for future research to examine whether the identified pathways hold across different national contexts, responding to calls for greater geographical diversity in hospitality management research (Lee et al., 2021).

Together, these four contributions respond to the persistent challenge identified in the hospitality IT literature: moving beyond the simplistic view of IT as a commodity and towards an empirically grounded understanding of how technology, culture, and learning interact to generate sustainable competitive advantage in hotel firms. By integrating these resources within a single RBV-based framework and testing it on a sample drawn from two national contexts, this study offers both theoretical advancement and practical guidance for hotel managers seeking to leverage IT investments more effectively.

Literature review and hypothesis development

The Resource-Based View (RBV)

The RBV emerged from researchers' growing need to understand why some companies achieved superior performance despite operating in the same competitive environment (Wilk and Fensterseifer, 2003). According to RBV, organisational performance is not solely determined by external factors that competitors can easily access but rather by the ability to retain specific resources or create new ones internally (Ahn et al., 2022; Barney, 1991).

RBV is based on two key premises (Barney, 1991, 1995):

(1) **Heterogeneity of resources** – resources are unevenly distributed across firms, meaning not all companies possess the same resources or in the same quantity.
(2) **Immobility of resources** – resources are imperfectly mobile and cannot be easily transferred or copied by competitors.

When a company possesses a rare, valuable, and imperfectly imitable resource that cannot be substituted, it can achieve sustained competitive advantage. Conversely, if a resource is widely available or easily replicated, it only leads to competitive parity or, at best, a temporary advantage (Barney, 1995).

Since its foundational articulation, the RBV has been substantially developed and its boundaries debated. Barney et al. (2001) extended the original framework by introducing the VRIO model, emphasising that resources must be not only Valuable, Rare, and Inimitable, but also supported by adequate organisational systems to generate sustained competitive advantage. A further significant extension came with the Dynamic Capabilities View (DCV), developed by Teece et al. (1997), which argued that in rapidly changing environments, competitive advantage derives not from the possession of resources per se but from a firm's ability to sense opportunities, seize them, and reconfigure its resource base accordingly. While the DCV has been applied to explain competitive advantage in hospitality contexts characterised by high environmental volatility (Chasapi et al., 2024; Prayag et al., 2024) — its focus on higher-order capability reconfiguration processes implies a longitudinal, process-oriented research design that falls outside the scope of the present study. The RBV is adopted here as the primary theoretical lens because the constructs under investigation — IT, OL, and OC — are conceptualised as organisational resources whose value derives from their current heterogeneous distribution across hotel firms, and because the cross-sectional design employed is well suited to testing the resource-complementarity logic that underpins the hypothesised pathways. This theoretical choice is consistent with recent hospitality research that applies RBV to examine the direct and complementary performance effects of technological and organisational resources in hotel contexts (Cheng et al., 2023; Ezzaouia and Bulchand-Gidumal, 2023; Hernandez and Lee, 2025).

From this perspective, IT in its generic form — standardised hardware and off-the-shelf software — is not considered a source of *sustained* competitive advantage, precisely because it is highly accessible and replicable across firms (Barney, 1995; Real et al., 2006; Tippins and Sohi, 2003). This view underpins a substantial body of empirical work showing that the direct effect of IT on firm performance is negligible or inconsistent when IT is treated as a homogeneous commodity (Bharadwaj, 2000; Bulchand-Gidumal and Melián-González, 2011; Powell and Dent-Micallef, 1997). However, the RBV simultaneously acknowledges that resources capable of generating even temporary competitive advantages may still yield measurable performance effects, as long as they are valuable to customers and not yet fully replicated by competitors (Barney, 1991, 1995). This nuance is particularly relevant in the hotel industry, where the pace of IT adoption

varies considerably across firms and where technology directly mediates the guest experience — a context in which IT retains a degree of resource heterogeneity that generic market analyses tend to overlook.

Growing empirical evidence reinforces this contextual specificity. Hernandez and Lee (2025) demonstrate, in a comprehensive review of the business value of hospitality and tourism technologies, that IT increases organisations' efficiency, enhances competitiveness, and leads to superior organisational performance, confirming that a direct performance effect of technology is both theoretically coherent and empirically observable in the hospitality sector. Iranmanesh et al. (2022) further show that disruptive digital technologies, including mobile applications, self-service kiosks, and data analytics, generate direct operational and experiential outcomes in hotels, independently of any mediating organisational process. In a similar vein, Ezzaouia and Bulchand-Gidumal (2023) provide empirical evidence that IT adoption positively affects both employee performance and financial performance in hotels, confirming that a direct IT–performance link is empirically detectable in the hospitality sector. Taken together, this body of evidence suggests that in the hotel context, IT retains sufficient resource heterogeneity to generate a direct, albeit potentially temporary, performance effect — consistent with Barney's (1991, 1995) recognition that valuable and imperfectly imitable resources contribute to competitive advantage even before full market diffusion occurs.

Acknowledging a direct IT–performance relationship does not contradict the broader RBV argument that IT, in isolation, is insufficient to generate sustained competitive advantage. The distinction is theoretically meaningful: a direct effect may reflect the value of IT as a resource that is currently heterogeneously distributed across hotels, while the indirect pathway — mediated by organisational learning and culture — captures the conditions under which that advantage becomes durable and difficult to imitate. This dual-pathway perspective is consistent with the complementarity logic advanced by Powell and Dent-Micallef (1997) and elaborated in subsequent IT-performance models (Bulchand-Gidumal and Melián-González, 2011; Melville et al., 2004), and it provides the theoretical foundation for the full set of hypotheses tested in this study.

Hypothesis 1. (H1): Information Technology has a positive direct influence on hotel performance.

Information technology and complementary resources

A growing body of research suggests that Information Technology (IT), when considered in isolation, is unlikely to generate sustainable competitive advantage, as it is often treated as a commodity (Bilgihan and Wang, 2016; Melville et al., 2004; Real et al., 2006; Tippins and Sohi, 2003). Instead, its strategic value emerges when combined with complementary intangible resources, a concept referred to as complementarity (Powell and Dent-Micallef, 1997). In this context, Organisational Learning (OL) plays a critical role by enabling firms to transform IT capabilities into improved processes, innovation, and performance outcomes (Lloria and Moreno-Luzon, 2014).

Recent studies support this view. Kumar et al. (2022) demonstrate that IT support facilitates knowledge sharing, which in turn drives service innovation performance in hotels, highlighting OL's mediating role between IT and performance. Similarly, Real et al. (2006) showed that IT's direct effect on performance is negligible unless mediated by complementary factors such as technological skills and learning capabilities.

In the hospitality sector, OL allows hotels to engage customers, adapt to market changes, and develop innovative services that competitors cannot easily imitate (Fraj et al., 2015; Piccoli et al., 2017). Modern IT tools, such as customer relationship management systems and data analytics, enable large-scale knowledge management, thereby accelerating organisational learning and innovation (Alavi and Leidner, 2001; Kumar et al., 2022).

Hypothesis 2. (H2): Information Technology has a positive influence on Organisational Learning in hotels.

Hypothesis 3. (H3): Organisational Learning has a positive influence on hotel performance.

Hypothesis 4. (H4): The relationship between IT and hotel performance is mediated by Organisational Learning.

Organisational culture and IT adoption

OC represents the shared values, beliefs, and assumptions that guide behavior within an organisation (Cameron and Quinn, 1999; Sanz-Valle et al., 2011). OC has long been recognised as a critical factor influencing the success of organisational change initiatives, including IT implementation (Chung et al., 2012; Leidner and Kayworth, 2006).

Failures in IT adoption are frequently linked to a mismatch between the existing cultural values and the demands of new technology (Iivari and Huisman, 2007; Krumbholz and Maiden, 2003). To ensure success, organisations must align cultural attributes with technological strategies, fostering values that support

collaboration, innovation, and knowledge sharing (Harper and Utley, 2001).

In the hospitality industry, recent evidence highlights that external partnerships also play a role. Cetinkaya et al. (2014) demonstrated that the quality of relationships between hotels and external IT service providers significantly affects IT adoption success, suggesting that both internal culture and external collaboration are crucial for maximizing IT value.

Hypothesis 5. (H5): Organisational Culture has a positive influence on Information Technology.

Organisational culture and organisational learning

OC also plays a fundamental role in fostering OL by shaping employee behavior and encouraging openness to change (Long and Fahey, 2000; Sanz-Valle et al., 2011). In hotels, a strong learning-oriented culture stimulates innovation and service improvement, enabling organizations to respond proactively to customer needs and environmental changes (Fraj et al., 2015).

Kumar et al. (2022) emphasize that OC facilitates knowledge sharing, which is essential for leveraging IT to drive innovation in hospitality services. This underscores the importance of aligning cultural values with IT initiatives to unlock the full potential of OL.

Hypothesis 6. (H6): Organisational Culture has a positive influence on Organisational Learning.

Organisational culture and performance

Research has explored the link between OC and performance. Strong cultures are associated with higher employee commitment, cooperation, and responsiveness to organisational objectives (Amah et al., 2013; Kemp and Dwyer, 2001). However, establishing a direct cause-and-effect relationship between culture and performance remains challenging due to the complex interactions involved (Marcoulides and Heck, 1993). Therefore, it is plausible that OC influences performance indirectly, primarily through its effects on OL.

Hypothesis 7. (H7): Organisational Culture does not have a direct influence on hotel performance.

Hypothesis 8. (H8): The relationship between Organisational Culture and performance is mediated by Organisational Learning.

Conceptual model

Based on the hypotheses above, the conceptual model (Figure 1) integrates three organisational resources, namely Information Technology, Organisational Learning, and Organisational Culture, and proposes both direct and indirect pathways through which these resources influence hotel performance. Consistent with the dual-pathway logic established in the theoretical framework, IT is hypothesized to exert both a direct effect on performance (H1) and an indirect effect mediated by Organisational Learning (H4). The direct pathway reflects the resource heterogeneity argument developed earlier: in the hotel industry, where the depth and sophistication of IT deployment varies substantially across firms and where technology directly mediates the guest experience, IT retains sufficient resource value to generate measurable performance effects independently of any mediating process (Barney, 1991; Ezzaouia and Bulchand-Gidumal,

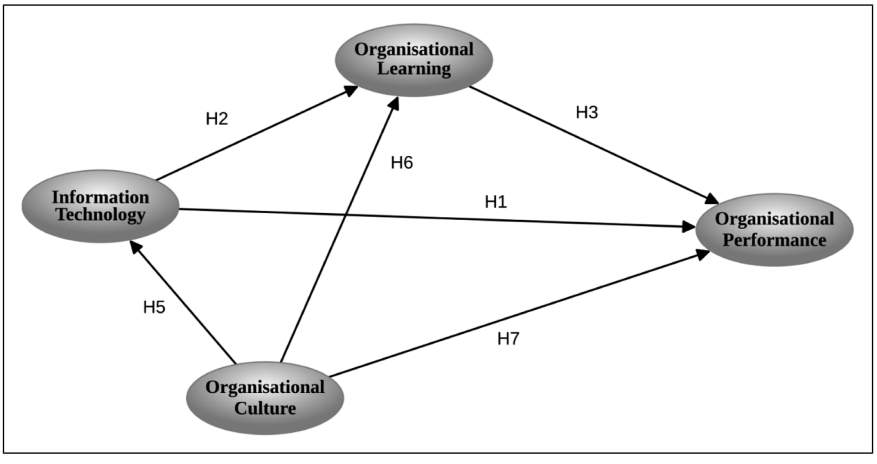


Figure 1. Theoretical framework
Note: *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$; n/s = non-significant.

2023; Hernandez and Lee, 2025). The indirect pathway, in turn, captures the conditions under which IT-based advantages become durable and difficult to imitate — namely, when IT is leveraged to foster organisational learning processes that transform technological capabilities into improved services, knowledge, and innovation (Real et al., 2006; Tippins and Sohi, 2003).

Organisational Culture occupies a multifaceted role in the model: it directly influences both IT adoption (H5) and Organisational Learning (H6), and its effect on performance operates exclusively through the indirect pathway via OL (H8). This architecture reflects recent calls to integrate internal organisational resources into a single empirical framework in order to better understand the mechanisms through which IT drives sustainable competitive advantage in the hospitality industry (Hernandez and Lee, 2025; Iranmanesh et al., 2022; Kumar et al., 2022).

Research methodology

Measures

The main constructs were measured as first-order reflective constructs with multiple indicators adapted from previous studies (Table 1) to ensure validity and reliability (Bolívar-Ramos et al., 2012). All items were carefully reviewed and slightly modified to fit the hospitality context, ensuring that the language and terminology were relevant for hotel professionals. This adaptation process enhances content validity by making the constructs context-specific and applicable to the hotel industry. Details of the full measurement instrument, including all original items, are provided as online supplementary material (Appendix A). Items removed during the CFA validation process are identified therein.

The questionnaire used a seven-point Likert scale, ranging from (1) "Strongly disagree" to (7) "Strongly agree." Sociodemographic variables were measured using single-item questions.

Given that the original items were in English, a rigorous translation and back-translation process was employed. The translated instrument was reviewed by four experts with significant experience in the hospitality sector to ensure clarity and cultural appropriateness. A pilot test with 20 hotel professionals was then conducted to confirm clarity and validity, leading to minor adjustments in wording prior to final distribution.

Finally, a Confirmatory Factor Analysis (CFA) was conducted to confirm the factorial structure of the scales in the hospitality context (Heritage et al., 2014). Following Fornell and Larcker (1981), constructs were assessed for internal consistency (factor loadings 0.7) and construct validity (Hair et al., 2010).

Procedure

Hotel firms were identified using official tourism board directories and professional hotel associations in both Brazil and Portugal. Only hotels with a classification of three stars or above were included, as these establishments are more professionalized and compete based on knowledge and innovation (Nieves and Segarra, 2015).

Data were collected via an online questionnaire between June 2016 and April 2017 using the "limesurvey.org" platform. Invitations were sent by email to hotel managers and other key professionals. A total of 994 invitations were distributed (379 in Portugal and 615 in Brazil). From these, 384 questionnaires were

Table 1. Structure of the questionnaire.

Block	Constructs/No. of items	Dimensions		Study used as a basis
Block III	Information technologies 15 items	IT1	IT Objects	Tippins and Sohi (2003)
		IT2	IT Operations	
		IT3	IT Knowledge	
Block IV	Organizational learning 18 items	OL1	Information systems	Lloria and Moreno-Luzon (2014)
		OL2	Framework for consensus	
		OL3	Institutionalization and Broadening of Knowledge	
		OL4	Management and Genesis of Knowledge	
Block V	Organizational culture 22 items	OC1	Management principles	Dawson et al. (2011) and Fernandes et al. (2016)
		OC2	Customer relationships	
		OC3	Job Variety	
Block VI	Organizational performance 10 items	OP1	Individual level performance	Bontis et al. (2002) and Real et al. (2006)
		OP2	Group level performance	
		OP3	Organizational level performance	

returned, yielding a 38.6% initial response rate. After data screening for incomplete or inconsistent responses, 295 valid questionnaires remained, resulting in a final valid response rate of 29.67%.

To assess representativeness, the distribution of hotel types in the sample was compared to national statistics for each country, showing a close alignment in terms of star rating and hotel size, indicating that the sample is reasonably representative of the target population.

Non-response bias was evaluated by comparing early and late respondents using t-tests on key demographic and organisational variables. No significant differences were found, suggesting that non-response bias is not a major concern in this study.

Ethical approval for the study was obtained from the relevant university ethics committee. Informed consent was explicitly included at the start of the survey, ensuring participants were aware of the study objectives, voluntary nature of participation, and data confidentiality.

No gifts or incentives were provided to participants.

Sample size justification

The adequacy of the sample size was evaluated according to the recommendations for Structural Equation Modeling (SEM). Following Westland (2010), a minimum sample size of 200 is considered acceptable for models with multiple latent variables and indicators. With 295 valid responses, the sample exceeds this threshold and is sufficient for robust parameter estimation and hypothesis testing.

Common method bias (CMB)

Given that data were collected using a single survey instrument administered to the same respondents, common method bias (CMB) was assessed as a potential concern. At the statistical level, Harman's single-factor test was conducted; the first unrotated factor accounted for less than 40% of the total variance (specifically, 32.7%), providing initial evidence that no single factor dominated the data (Podsakoff et al., 2003). While this test is acknowledged as a conservative indicator, it is complemented by procedural design controls implemented prior to data collection: respondents were assured of full anonymity; the survey instrument interleaved items from different constructs to reduce response consistency effects; and participants were explicitly instructed to answer each block independently based on their professional experience (Podsakoff et al., 2012). Taken together, these statistical and procedural measures suggest that CMB is unlikely to severely distort the findings, although it cannot be entirely ruled out given the single-source design — a limitation acknowledged in the final section of this paper.

Sample characteristics

The final sample consisted of professionals from three-star hotels and above. This focus was chosen because higher-standard hotels are more likely to have formalized processes, advanced technology use, and professional management structures, making them ideal for testing the study's theoretical model. The

Table 2. Demographic characteristics of the sample.

Professionals	n = 295	Hotels where professional work	n = 295
Gender		Location	
Female	49.2%	Brazil	43.7%
Male	50.8%	Portugal	56.3%
Age		Hotel's Operating area	
Mean	38.4	Fully business	5.4%
Median	38.0	Predominantly business	25.8%
		Business and leisure	31.9%
		Predominantly leisure	32.9%
		Fully leisure	4.1%
Education		Housing units	
High school/Professional	32.9%	Less than 150 units	27.5%
Undergraduate degree	39.7%	151 - 250 units	21.0%
Graduate degree	27.4%	251 - 350 units	11.9%
		351 units or more	39.7%
		Classification	
		3 stars	15.9%
		4 stars	44.1%
		5 stars	40.0%

demographic characteristics of the sample can be seen in Table 2. The sample is mainly composed of male gender (50.8%) with a mean age of 38.40 years and with a university degree (67.1%). Regarding the characteristics of the hotels studied, the sample is mainly formed by hotels that operate predominantly in leisure activities (37%), have 4 stars or more (84.1%) and have more than 251 housing units (51.6%).

Data analysis and results

Reliability and validity of the measurement model

Following Anderson and Gerbing (1988), a two-step approach was adopted, which consisted of examining individual measurement models and then the structural model. Regarding the validation of the measurement model, a Confirmatory Factor Analysis (CFA) was performed, using AMOS 23.0. Based on the maximum likelihood method, a variety of indexes were calculated to provide an indication of the quality of adjustment since there is no universally accepted adjustment index to evaluate a measurement model.

A good adjustment was obtained, $\chi 2/df = 2.469$ ($p < 0.001$), GFI = 0.910 (Goodness of Fit Index > 0.90), CFI = 0.959 (Comparative Fit Index > 0.90), RMSEA = 0.071 (Root Mean Square Error of Approximation 0.05 or <0.08 acceptable), SRMR = 0.044 (Standardized Root Mean Square Residual < 0.05), and MECVI = 1.108 (Modified Expected Cross-Validation Index; lower values indicate better fit) (Byrne, 2010).

The composite reliability estimates of all factors were between 0.795 and 0.935 suggesting acceptable reliability (Hair et al., 2010), demonstrating consistency and reproducibility of the measure. The scale's construct validity, that is, whether it actually measures or operationalizes the construct to be evaluated, was verified through convergent and discriminant validity (Fornell and Larcker, 1981). The convergent validity evaluates the degree to which two items, which reflect the same factor, are correlated. It was evaluated through the average variance extracted measure (AVE), being considered satisfactory when above the minimum recommended value of 0.50 (Fornell and Larcker, 1981). Discriminant validity occurs when the construct under study is not correlated with constructs that operate latent variables different from those operated by the construct under study (Anderson and Gerbing, 1988). It is verified when the square root of AVE for each construct is greater than the standardized correlation of that construct with all the others (Anderson and Gerbing, 1988), that is, the maximum shared variance (MSV) and average shared squared (ASV) of the analyzed factors should be smaller than the AVE of each factor.

It was observed that the AVE of all factors presented values above 0.50 and the values of MSV and ASV were smaller than the AVE of each factor (Table 3).

Table 4 further shows that the square root values of the AVE of each construct, on the diagonal (in bold), are superior to the correlations between the constructs (Fornell and Larcker, 1981; Hair et al., 2011), confirming the existence of discriminant validity.

Table 3. Properties of reliability and convergent and discriminant validity of the general measurement model.

Construct	Factors	Standard factorial weights	CR	AVE	MSV	ASV
Information technology	IT1	0.821	0.886	0.722	0.367	0.159
	IT2	0.863				
	IT3	0.865				
Organizational learning	OL1	0.928	0.935	0.782	0.367	0.212
	OL2	0.783				
	OL3	0.897				
	OL4	0.922				
Organizational culture	OC1	0.975	0.891	0.733	0.197	0.083
	OC2	0.751				
	OC3	0.827				
Organizational performance	OP1	0.861	0.918	0.790	0.358	0.166
	OP2	0.899				
	OP3	0.905				
Term of interaction between IT and OC (OC*IT)	OC1xIT1	0.770	0.795	0.563	0.013	0.004
	OC2xIT2	0.751				
	OC3xIT3	0.730				

Note. Satisfactory indications by Fornell and Larcker (1981) and Garver and Mentzer (1999): CR > 0.7; AVE > 0.5; CR > AVE; MSV < AVE and ASV < AVE.

Structural model and hypothesis testing. Since the measurement model evaluation provided evidence of reliability and validity, the structural model was examined to evaluate the hypothesized relationships among the constructs in the research model (Hair et al., 2010). The most suitable method for the study was CB-SEM. The significance of the structural coefficients was evaluated using a Z test produced by AMOS Graphics 23 (CR and p-value). In addition, bootstrap resampling with 5000 subsamples was applied to estimate standard errors and 95% confidence intervals (CI) for all direct, indirect, and total effects, following the recommendations of Hair et al. (2010). Parameters with p 0.05 were considered statistically significant.

The CFI, GFI and RMSEA indexes reported above were used to evaluate the goodness of fit of the model. Relative Normed Fit Index (RNFI), Parsimony Goodness of Fit Index (PGFI > 0.6) and Parsimony Comparative Fit Index (PCFI > 0.60) were used to compensate for the artificial improvement of the model (if any) simply by adding more free parameters bringing the model under study closer to the saturated model. In general, the maximum likelihood estimation showed a very good adjustment quality, consistent with the measurement model. The global fit indicators were acceptable, $\chi 2/df = 2.444$ ($p < 0.001$), GFI = 0.902, CFI = 0.953, PGFI = 0.643, PCFI = 0.764, RMSEA = 0.071 and RNFI = 0.927 (Byrne, 2010; Hair et al., 2010).

Figure 2 presents the results of the structural model, defined from the global measurement model, with the significance of the hypothesised structural paths under study.

In terms of variance explained, the model accounts for 39% of the variance in Organisational Performance, 48% of the variance in OL, and 5% of the variance in IT (Figure 2). These values indicate substantial explanatory power for OL and performance, consistent with Cohen's (1988) benchmarks for endogenous latent variables in SEM (R^2 0.26 = substantial), and a small effect for IT (Table 5).

The model test showed that OC had no direct significant influence on Organisational Performance (β = 0.021; CI [−0.118, 0.149]; $p = 0.737$), confirming that OC operates exclusively through indirect pathways in the model (H7 supported). As an exploratory analysis, the potential moderating effect of OC on the IT–OL relationship was also examined. The result was non-significant (β = −0.014; CI [−0.089, 0.065]; p = 0.794), indicating that OC does not condition the strength of the IT–OL relationship. This finding suggests that while OC shapes the conditions under which IT is adopted and learning is fostered, through its direct effects on IT (H5) and OL (H6), it does not amplify or attenuate the mechanism by which IT activates OL. In other words, once IT is in place, its capacity to foster organisational learning operates independently of the prevailing cultural context.

The analysis further confirmed that IT has a positive and direct effect on Organisational Performance (β = 0.188; CI [0.042, 0.322]; p = 0.011), supporting Hypothesis 1. Although this direct effect is small to moderate in magnitude, it is consistent with the theoretical argument developed earlier: in the hotel industry, where IT deployment varies substantially across firms and where technology directly mediates the guest experience, IT retains sufficient resource value to generate measurable performance effects independently of any mediating process (Barney, 1991; Ezzaouia and Bulchand-Gidumal, 2023; Hernandez and Lee, 2025). Importantly, the coexistence of a direct IT–performance effect alongside a significant indirect pathway via OL (H4) is not theoretically contradictory; rather, it reflects the dual nature of IT as a resource within the RBV framework, generating temporary competitive advantage through its current heterogeneous distribution across hotels, while simultaneously enabling durable advantage when combined with complementary organisational capabilities such as OL (Powell and Dent-Micallef, 1997; Tippins and Sohi, 2003). All other hypothesized relationships were confirmed.

To better understand the indirect effects, the mediation analysis was evaluated using the Variance Accounted For (VAF), which measures the proportion of the total effect explained by the mediating variable. Although VAF is more commonly associated with PLS-SEM, it is used here as a complementary measure to support the interpretation of mediation effects, alongside bootstrapping and confidence intervals.

The VAF is calculated as the ratio of the indirect effect to the total effect, where values below 20% indicate no mediation, values between 20% and 80% indicate partial mediation, and values above 80% indicate full mediation (Hair et al., 2010). In this study, the relationship between IT and Performance mediated by OL produced a VAF of 56%, indicating partial mediation. This indicates that more than half of IT's total influence on performance occurs indirectly through OL, reinforcing the central role of OL as a

Table 4. Correlations between the constructs.

	OC	IT	OL	OP	OC*IT
OC	**0.856**				
IT	0.212	**0.850**			
OL	0.444	0.606	**0.884**		
OP	0.279	0.474	0.598	**0.889**	
OC*IT	0.113	0.009	0.020	0.048	**0.751**

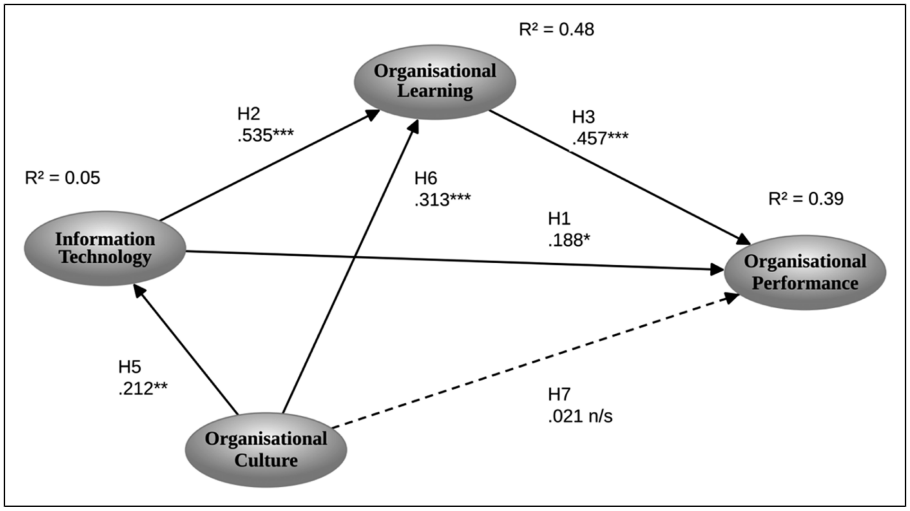


Figure 2. Final structural model with standardised paths.

mechanism for leveraging technology to improve outcomes. The indirect effect was statistically significant (β = 0.244; CI [0.150, 0.366]; $p < 0.001$). The relationship between OC and Performance yielded a VAF of 92%, and since the direct effect was non-significant, this indicates full mediation. This indirect effect (β = 0.235; CI [0.138, 0.312]; $p < 0.001$) comprises three paths, the largest of which runs through OL (OC–OL–OP), confirming that while OC does not directly influence performance, it does so indirectly by fostering learning processes that enhance hotel operations.

Table 6 summarizes the standardized coefficients, p-values, and the status of each hypothesis.

Conclusion and implications

Discussion

The results of this study provide empirical support for the dual-pathway model proposed in the theoretical framework. Consistent with H1, IT exerts a positive and direct effect on hotel performance, confirming that in the hospitality sector, where the depth of IT deployment varies substantially across firms and technology directly mediates the guest experience, IT retains sufficient resource value to generate measurable performance outcomes independently (Barney, 1991; Hernandez and Lee, 2025). Equally, and consistent with H4, this direct effect coexists with a significant indirect pathway via Organisational Learning (VAF = 56%), confirming that OL partially mediates the IT–performance relationship. In other words, IT improves hotel performance both on its own and through its capacity to enable knowledge creation and organisational learning, a result that extends and nuances the earlier work of Tippins and Sohi (2003) and Real et al. (2006) by demonstrating that the indirect pathway, while important, does not exhaust the full performance-generating potential of IT in hotel contexts.

These findings suggest that IT becomes more effective when hotels create and maintain conditions that support knowledge development, enabling employees

Table 5. Results of the structural model (direct, indirect and total effect).

Hypothesis *(Path analysis)*	Direct effects	Indirect Effects *(Significance by Bootstrap simulation)*	Total Effect
IT → OP	$\beta = 0.188$ $p = 0.011$	$\beta = 0.244$ $p = 0.000$	$\beta = 0.432$ $p = 0.000$
IT → OL	$\beta = 0.535$ $p = 0.000$	---	$\beta = 0.535$ $p = 0.000$
OL → OP	$\beta = 0.457$ $p = 0.000$	---	$\beta = 0.457$ $p = 0.000$
OC → IT	$\beta = 0.212$ $p = 0.001$	---	$\beta = 0.212$ $p = 0.000$
OC → OL	$\beta = 0.313$ $p = 0.000$	$\beta = 0.113$ $p = 0.001$	$\beta = 0.426$ $p = 0.000$
OC → OP	$\beta = 0.021$ $p = 0.737$	$\beta = 0.235$ $p = 0.000$	$\beta = 0.256$ $p = 0.000$
OC*IT →OL[a]	$\beta = -0.014$ $p = 0.794$	---	$\beta = -0.014$ $p = 0.794$

Note. $p =< 0.05$.
[a]Tested as an exploratory analysis; not a formal hypothesis of the model.

Table 6. Hypothesis test results.

Hyp.	Independent Variable	Dependent Variable	Mediator/Moderator	Results	Conclusions
H1	IT	OP	None	Positive and statistically significant (β = 0.188; p = 0.011)	Supported
H2	IT	OL	None	Positive and statistically significant (β = 0.535; p = 0.000)	Supported
H3	OL	OP	None	Positive and statistically significant (β = 0.457; p = 0.000)	Supported
H4	IT	OP	OL	Positive and statistically significant (β = 0.244; p = 0.000)	Supported
H5	OC	IT	None	Positive and statistically significant (β = 0.212; p = 0.001)	Supported
H6	OC	OL	None	Positive and statistically significant (β = 0.313; p = 0.000)	Supported
H6a	OC	OL	IT	Positive and statistically significant (β = 0.113; p = 0.001)	Supported
H7	OC	OP	None	Non-significant effect (β = 0.021; p = 0.737)	Supported
H8	OC	OP	OL	Positive and statistically significant (β = 0.235; p = 0.000)	Supported

[a]Tested as an exploratory analysis; not a formal hypothesis of the model.

to generate, share, and apply new insights. At the same time, IT can also improve performance independently, particularly when it involves resources that are specific to the hotel and difficult to replicate, generating temporary competitive advantages. This is consistent with the RBV perspective, which highlights that resources can contribute to performance if they are valuable and not easily imitated (Barney, 1991, 1995).

The direct effect observed in this study may reflect the role of digital technologies that have become increasingly relevant in the hotel industry, such as self-service kiosks, mobile applications, social media, and data analytics, which enable hotels to improve efficiency and enhance customer experiences (Iranmanesh et al., 2022). More recently, the emergence of generative AI tools, including chatbots and AI-driven recommendation systems, has further expanded the potential of technology to transform hotel operations and personalise the guest experience (Fouad et al., 2024). For example, mobile applications and self-service technologies can streamline service delivery and improve customer relationships, while data generated through digital channels can support decision-making by managers and help design better services, thus impacting organisational performance.

However, as the literature consistently highlights, the mere adoption of technology is not sufficient to guarantee success (Leidner and Kayworth, 2006). More recent evidence on artificial intelligence in hotels points in the same direction, showing that AI is reshaping the competencies and organisational systems required in service jobs, and that its benefits depend on employee training and organisational support rather than on the technology alone (Wang et al., 2025). The findings of this study reinforce this view, as they show that when OL is included in the model, part of the impact of IT on performance is transmitted through OL, confirming that hotels must not only acquire technological resources but also develop learning processes that enable staff to use these tools effectively. OL plays a central role by facilitating the transformation of technological capabilities into improved processes, services, and innovations (Real et al., 2006; Tippins and Sohi, 2003).

The role of OC is also evident in the results. OC influences the effective use of IT, which in turn impacts OL. The results indicate that OC has an indirect effect on organisational performance through its positive influence on OL. This suggests that supportive culture creates an environment where IT can be used strategically to foster knowledge sharing and continuous improvement, ultimately leading to better performance outcomes. These findings are consistent with previous research highlighting the importance of culture in shaping technology adoption and learning processes (Leidner and Kayworth, 2006; Sanz-Valle et al., 2011).

These findings further confirm that OC is a critical factor for hotels seeking to generate value from IT investments. When cultural values, norms, and practices encourage collaboration and innovation, employees are more likely to engage in behaviors that enhance OL and make better use of technological tools. This is consistent with the literature that positions OC as a determinant of successful IT implementation and a

driver of organisational responsiveness and commitment to shared goals (Amah et al., 2013).

Taken together, the results indicate that hotels can improve performance by integrating IT with OL and OC, reinforcing the idea that technology alone does not guarantee superior results. Instead, it is the combination of technological, cultural, and learning resources that enables hotels to create unique and difficult-to-imitate capabilities. These findings offer valuable insights for both researchers and practitioners by demonstrating how internal organisational factors mediate and shape the impact of IT on performance within the hotel industry.

Theoretical implications

The primary theoretical contribution of this study lies in demonstrating empirically that IT generates performance outcomes through two distinct but complementary mechanisms within a Resource-Based View framework. Prior hospitality research, building on foundational RBV work, has predominantly argued that IT lacks the resource characteristics required to produce direct performance effects, and that its value is realised only through complementary organisational resources (Bulchand-Gidumal and Melián-González, 2011; Real et al., 2006; Tippins and Sohi, 2003). Extending this literature, the present study demonstrates that these two positions are not mutually exclusive in the hotel context: IT can generate a direct, context-specific performance effect, reflecting its current heterogeneous distribution across firms and its role in directly mediating the guest experience, while simultaneously enabling durable, difficult-to-imitate advantage when combined with Organisational Learning. This dual-pathway result contributes a more nuanced understanding of how IT creates value in hospitality settings and responds to the call by Cohen and Olsen (2013) and Melián-González and Bulchand-Gidumal (2016) for empirical models that capture the full complexity of IT's role in hotel performance.

A second theoretical contribution concerns the role of Organisational Culture in the model. OC was confirmed as a positive predictor of both IT adoption and Organisational Learning, reinforcing the view that cultural values and norms shape the conditions under which technology is effectively implemented and knowledge is generated (Leidner and Kayworth, 2006; Sanz-Valle et al., 2011). Additionally, the results reveal that IT partially mediates the relationship between OC and OL, a finding that, while not the primary focus of the study, is theoretically coherent: OC creates the organisational conditions that foster IT adoption, and it is through this IT adoption that learning processes are subsequently activated. This partial mediation pathway suggests that culture's influence on learning is not purely direct but is, in part, channelled through the technological infrastructure that a supportive culture helps to put in place.

The absence of a direct relationship between OC and organisational performance is consistent with the argument by Marcoulides and Heck (1993) that establishing a direct positive relationship between these constructs is challenging, given the complexity of the cause-and-effect mechanisms involved. The present study confirms that OC's influence on organisational performance operates through OL, consistent with the findings of Pérez López et al. (2004), Zheng et al. (2010) and Nold (2012).

Management implications

The findings of this study carry several practical implications for hotel managers. First, hotels should refine their business models in view of the important role of OC. Hotel employees are central to achieving the core organisational objective of delivering quality service and ensuring guests feel welcome. Moreover, employees are increasingly taking on new roles, helping in the process of innovation and differentiation through the co-creation of knowledge (Kandampully et al., 2016). Cultivating an OC that encourages employees to embrace these roles will help hotels build a sustainable competitive advantage.

Regarding IT, it is a critical resource for gaining competitive advantage and improving performance. However, possessing advanced and appropriate IT provides only a temporary advantage, as the same technologies can be adopted by competing firms. If hotels want to make better use of IT, it is important to invest in training, so that professionals can use these tools effectively and creatively, given that human capital remains an irreplaceable source of creativity and innovation. For example, as Iranmanesh et al. (2022) demonstrate, the use of big data technologies can bring benefits such as predicting hotel occupancy rates, optimizing prices, assisting in market segmentation, and reducing operational waste. However, without adequately trained and motivated staff to operate these technologies, such benefits are unlikely to be realised.

Furthermore, managers should recognise that available IT should serve as a catalyst for professional creativity (Kandampully et al., 2016; Tavitiyaman et al., 2011), facilitating learning, enabling employees to reach their potential, and supporting the generation of knowledge that can be embedded in hotel processes. Alongside these processes, OC acts as both a driver of organisational identity and a practical expression of the hotel's values, and sustained attention to cultural

development ensures consistency, influences outcomes, and adds value to the services offered to guests.

Regarding the OL process, managers must invest in employee development, since the continuous evolution of guest preferences and expectations demands that hospitality professionals develop the capacity to absorb knowledge, both individually and collectively, in order to reduce inefficiencies and deliver the personalised service that modern guests expect. Organisations should develop policies that value employees, address high staff turnover, and mitigate the elevated stress levels that characterise the industry.

Finally, the results confirm that the relationship between IT and organisational performance is significant, with implications across multiple management levels. IT enables hotels to identify knowledge gaps, strengthen customer relationships, and enhance innovation capabilities. Its role in supporting organisational learning and reinforcing cultural values is equally important, equipping employees with the knowledge and skills needed to reflect the organisation's values and improve guest satisfaction.

Limitations and future research directions

In methodological terms, a first limitation concerns the scope of the sample. The focus on hotels of three stars or above limits the generalisability of the findings to lower-category establishments and other segments of the hospitality industry. Future research should replicate the model across a broader range of hotel categories to assess whether the identified pathways hold in contexts with different resource endowments and managerial structures.

A second limitation concerns the cross-sectional design of the study. Data were collected at a single point in time, which constrains the ability to establish temporal precedence between constructs and limits causal inference. Whilst the hypothesised structural paths are grounded in a well-established theoretical framework and are consistent with prior longitudinal evidence in the IT–performance literature (Real et al., 2006; Tippins and Sohi, 2003), the present study can only demonstrate the existence and direction of associations, not causal relationships in the strict sense. All conclusions should therefore be interpreted as evidence of theoretically predicted associations rather than established causal effects. Future research employing longitudinal or experimental designs would strengthen the causal claims implied by the RBV-based framework and allow for the detection of reciprocal processes, such as the possibility that IT implementation may in turn reshape organisational culture over time.

A third limitation concerns the operationalisation of organisational performance through perceptual, self-reported measures. Whilst the use of perceptual performance indicators is well-established in hospitality management research, particularly when objective financial data are commercially sensitive or unavailable at the property level (Bontis et al., 2002; Lee et al., 2021; Real et al., 2006), this approach carries an inherent risk of same-source bias, which may inflate the observed relationships between performance and the other constructs measured in the same survey. More broadly, it is important to acknowledge that common method bias cannot be completely ruled out in this study, as all constructs were measured using the same respondent at a single point in time (Podsakoff et al., 2003, 2012). Whilst the procedural and statistical controls described in the methodology section partially mitigate this risk, future studies should seek to triangulate perceptual measures with objective performance indicators such as RevPAR, occupancy rates, or TripAdvisor scores, and consider multi-source data collection designs to further strengthen the validity of the findings.

A fourth limitation concerns the explanatory scope of the model. Whilst $R^2 = 0.39$ for organisational performance exceeds Cohen's (1988) threshold for substantial explanatory power in SEM models with endogenous latent variables (R^2 0.26), the model intentionally focuses on three internal organisational resources, namely IT, OL, and OC, as theorised within the RBV framework. Variables external to the organisation, such as competitive strategy, market dynamism, innovation capability, or environmental uncertainty, are not captured in the present model and may account for a meaningful portion of the remaining unexplained variance. Future research should explore the extent to which these contextual variables moderate or supplement the internal resource-based pathways identified here, particularly in hotel markets characterised by high competitive intensity or rapid technological change.

A fifth limitation concerns the temporal context of the data collection. The survey was administered between June 2016 and April 2017, prior to the COVID-19 pandemic, which profoundly reshaped the hospitality technology landscape through the accelerated adoption of contactless technologies, remote service systems, and AI-driven tools (Salem et al., 2024). Whilst the RBV-based theoretical model and the constructs examined, namely IT capability, Organisational Learning, and Organisational Culture, remain conceptually robust and independent of any specific technological configuration, readers should interpret the specific technology-related findings with caution in light of post-pandemic developments, including the rapid emergence of generative AI, chatbots, and advanced data analytics that have significantly reshaped the hospitality technology landscape (Fouad et al., 2024). Nevertheless, the pathways identified here are consistent with more recent hospitality evidence (Ezzaouia and

Bulchand-Gidumal, 2023; Hernandez and Lee, 2025), and the present findings can serve as a pre-pandemic baseline against which future research, replicating this model with more recent data, may assess whether the pandemic-induced digitalisation wave has altered the magnitude or direction of these pathways.

A sixth limitation concerns the geographical scope of the analysis. Whilst data were collected across two countries, namely Portugal and Brazil, no formal multi-group analysis was conducted to test structural invariance across national samples, which limits the comparative conclusions that can be drawn. The two-country sampling strategy broadens the geographical scope of the study beyond single-country designs but does not in itself constitute a cross-national comparative test. Future research should replicate the model separately in each national context, or conduct formal multi-group SEM analyses, to assess whether the identified pathways are consistent across distinct institutional and cultural settings.

A seventh limitation concerns the hotel segment. The relationships identified in this study may not generalise uniformly across different hotel segments, such as budget, luxury, boutique hotels, resorts, and international chains. These segments differ in terms of resource availability, technological sophistication, and managerial practices, which may influence how IT, Organisational Learning, and Organisational Culture interact to impact performance. Future research should explore these boundary conditions to better understand how the effectiveness of IT investments may differ across diverse contexts and operational realities.

An eighth limitation concerns the methodological approach. Future studies could benefit from qualitative approaches to better understand the interaction between IT and Organisational Culture, given that technology is developed, implemented, and used by individuals whose behaviours are shaped by cultural contexts. Examining how these elements interact qualitatively may provide deeper insights into the mechanisms through which sustainable competitive advantage is achieved in the hotel industry.

ORCID iDs

Adriana L Fernandes https://orcid.org/0000-0001-7025-9470
Bráulio Alturas https://orcid.org/0000-0003-0142-3737
Daysa Andrade Oliveira https://orcid.org/0009-0005-5754-9592

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Supplemental material

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Author biographies

Adriana L. Fernandes is an Invited Assistant Professor from Escola Superior Nautica Infante D Henrique and Instituto Universitário de Lisboa (ISCTE-IUL) and is currently a researcher of the Information Systems Group of ISTAR-Iscte (University Institute of Lisbon), Lisbon, Portugal. She holds a PhD in Information Science and Technology from ISCTE-IUL, MSc in Administration from Pontifícia Universidade Católica de Minas Gerais, Brazil and a BSc in Administration from Pontifícia Universidade Católica de Minas Gerais, Brazil. Her research interests include Information Science, Information Management, Organizational Learning and Organizational Culture. Adriana L. Fernandes can be contacted at: adriana.fernandes@iscte-iul.pt

Bráulio Alturas is an Associate Professor with habilitation at the Department of Information Science and Technology from Instituto Universitário de Lisboa (ISCTE-IUL) and is currently researcher of the Information Systems Group of ISTAR-Iscte (University Institute of Lisbon), Lisbon, Portugal. He holds a PhD in Management with specialization in Marketing, MSc in Management Information Systems, and BSc in Business Organization and Management, all from ISCTE-IUL. His research interests and publications are in acceptance and use of technology, digital marketing, social media, e-commerce, information management, information systems, direct selling and consumer behavior. Bráulio Alturas can be contacted at: braulio.alturas@iscte-iul.pt

Daysa Andrade Oliveira holds a PhD in Administration from the Cepead Postgraduate Program at the Federal University of Minas Gerais (UFMG). Manager of Continuing Education at the Antônio Eufrásio de Toledo University Center in Presidente Prudente, covering the areas of Free Courses and Postgraduate Studies. Professor of postgraduate programs and also professor of undergraduate and distance learning courses at Toledo Prudente in the aforementioned institution. Coordinator of MBA Programs at the Toledo Prudente Postgraduate Center. He has already carried out activities related to the Coordination of the Administration and Tourism Course; TCC Coordination of the Administration and Tourism Course; Coordination of Supervised Internship for the Administration Course and teaching in undergraduate and postgraduate courses. Currently, he is dedicated to studies on Human Resources Management. Daysa A. Oliveira can be contacted at: daysa.andrade@toledoprudente.edu.br