Elucidating the effect of information technology capabilities on organizational performance in UAE: a three-wave moderated-mediation model

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Abstract

Purpose – This paper aims to investigate information technology capabilities (ITC)'s influence on organizational performance (OP) within the hospitality industry. Specifically, it analyzes the indirect effects of sustainability practices (SP) and service quality (SQ) on the relationship between ITC and OP. The moderating effect of top management support (TMS) is also examined.

Design/methodology/approach – Using a three-wave time-lagged design, 507 UAE hotels' managers took part in the study. Hierarchical regression bootstrapping approach was used to examine the hypothesis.

Findings – This study suggests that ITC are positively related to OP. Furthermore, the study found that SP and SQ mediate the ITC-OP relationship. TMS moderates the positive relationship between ITC and OP and also moderates the relationship between SQ and OP. Additionally, TMS moderates the indirect effect of SQ on the association between ITC and OP, such that the mediating effect is stronger when TMS is at a high level.

Research limitations/implications – The study shall assist the practitioners of the hospitality firms to focus their attention on ITC to improve SQ and hence achieve optimal performance.

Originality/value – The novelty of this research lies in the presentation of an integrated framework based on a resource-based view to solve the contemporary challenges facing hospitality firms operating in emerging markets in integrating ITC and SP for better organizational results.

Keywords Information technology capabilities, Service quality, Sustainability practices, Top management support, Organizational performance, Resource-based view

Paper type Research paper

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1. Introduction

Over the past decades, the hospitality and tourism industries have been considered a major contributor to service economies globally (Bhutto *et al.*, 2021). However, managers in the hospitality and tourism industries face many challenges related to globalization (Khanra *et al.*, 2020a b), increased competition (Prud'homme and Raymond, 2016) and the development of information and communication technologies that enable consumers to compare offerings (Chen and Tsou, 2012). This industry has come under further pressure by the global COVID-19 pandemic (Bresciani *et al.*, 2021). An important element that significantly affects organizational performance (OP) is a firm's ability to alter the organization's existing structure, relating to information technology capabilities (ITC). Thus, organizations mobilize and deploy their IT-based resources with superior ITC to maintain competitiveness and significantly improve performance (Arora and Rahman, 2017; Bhatti *et al.*, 2021; Ferraris *et al.*, 2018).

Technical and market information is crucial for firms to focus on and convert existing opportunities into profits (Griffin and Hauser, 1992). Corporates may use existing IT resources to improve their performance (Callaway and Jagani, 2015; Rana *et al.*, 2021). However, IT resources themselves will not necessarily lead to improved performance, as they are inputs for developing ITC (Benavides-Velasco *et al.*, 2014). Thus, ITC are an important factor affecting OP, a company's ability to make essential changes to the existing organizational structure. A robust IT infrastructure and IT personnel have resulted in a considerable increase in productivity and profitability for businesses (Callaway and Jagani, 2015; Jabeen *et al.*, 2021).

Further, notably, IT creates value when combined with other organizational factors synergistically (Tandon *et al.*, 2021). Mainly, advances in IT have prompted the hospitality industry to initiate sustainability practices (SP) and enhance service quality (SQ). However, how ITC maximize the impact of SP on performance remains unclear in previous research and requires further investigation (Akram *et al.*, 2018; Chege and Wang, 2020; Mehmood *et al.*, 2021; Mehmood and Hussain, 2017a). SP aim to initiate sustainable methods in business by integrating environmental protection obligations, economic growth, and social cohesion to add value to shareholders and stakeholders (Awan *et al.*, 2020; Omar *et al.*, 2019). The hospitality industry currently faces considerable challenges from competitors in differentiating products and services, for which they need to be committed to SP (Benavides-Velasco *et al.*, 2014).

In contrast, in today's marketplace, one of the most fundamental challenges companies face is providing eco-friendly services without adversely affecting the quality of their services (Abd-Elrahman and Kamal, 2020; Müller and Pfleger, 2014; Ray *et al.*, 2019; Wattanakamolchai *et al.*, 2016). Most organizations have made enormous investments in IT, a strategic imperative to improve customer services (Awan *et al.*, 2021; Mandić and Praničević, 2019). SQ is the most important factor for achieving customer satisfaction and loyalty (Li *et al.*, 2021; Priporas *et al.*, 2017). Therefore, IT is becoming more powerful in supporting SQ to maximize OP through innovation and continuous service improvements (Raymond *et al.*, 2019).

Information systems researchers use the resource-based view (RBV) theory to relate the value of IT contributions to OP (Tirgari, 2012), and the latter depends on the composition and use of corporate resources and capabilities (Ray *et al.*, 2005). RBV, an approach to achieve a competitive advantage, emerged in the 1980s and 1990s. Recent studies have employed this model to mobilize and deploy the multifaceted bundles of IT resources combined with other resources and capabilities to improve various indicators of firm performance (Bharadwaj, 2000; Grant, 1991; Nevo and Wade, 2010). As per RBV, exploiting ITC is critical for organizations to be more competitive (Callaway and Jagani, 2015; Fink, 2011). Mainly, contexts

that support the creation of a high level of product innovation and improvement using ITC may lead to competitive advantage (Mehmood and Hussain, 2017b; Raymond *et al.*, 2018).

Prior research has posited that the effect of top management support (TMS) is visible in terms of a manager's innovativeness to provide better customer services (Ruiz-Palomino *et al.*, 2019). Additionally, the literature suggests that TMS positively impacts ITC to facilitate knowledge acquisition and thus identify solutions for complex problems (Kanwal *et al.*, 2017). Although studies have indicated that TMS can play a key role in achieving desired organizational outcomes (Tang, 2016), we argue that examining TMS as a moderator between ITC and OP is important as it can help managers understand the importance of ITC in improving performance. With TMS, organizational outcomes can be improved, including service development and innovation (Lyver and Lu, 2018; Raymond *et al.*, 2018), while planning to make business operations sustainable by adopting new sustainable management practices (Cvelbar and Dwyer, 2013; Müller *et al.*, 2021).

The literature review reveals the importance of ITC, as it significantly impacts OP (AlDari *et al.*, 2021; Raymond *et al.*, 2019). ITC play a key role in the hospitality industry and contributes to efficiency and flexibility (Ferraris *et al.*, 2018) because it provides valuable information to attain business advantage (Benavides-Velasco *et al.*, 2014; Mehmood *et al.*, 2019). However, the relationship between ITC and OP has been challenged. It is argued that without the intelligent use of ITC in managing various organizational processes, an organization cannot plays a strategic role in this era of intense competition (Akram *et al.*, 2018). Further, organizations cannot benefit from IT without effective usage and strong capabilities. Another issue discussed in the literature is whether ITC influence OP directly or indirectly. Some researchers have investigated the direct impact of IT on OP (Ajamieh *et al.*, 2016; Bharadwaj, 2000), while others have studied its indirect effect (Lyver and Lu, 2018; Raymond *et al.*, 2019). These different results do not recognize the relationships between ITC and their impact on a firm's performance. Anthony *et al.* (2019) stated that there is scarce research providing rigorous tests of theoretical propositions. For example, previous studies have noted that ITC are associated with both SP (Saunila *et al.*, 2019) and SQ (Benavides-Velasco *et al.*, 2014), albeit separately in different studies. Despite significant research over the past decade, few studies have investigated the relationship between ITC and SQ (Yang *et al.*, 2017) and SP (Debnath, 2020). Additionally, a limited theoretical perspective exists in the literature that clarifies the relationships among these constructs, specifically the value of ITC in management practices in the hospitality domain (Khanra *et al.*, 2020), and hence calls for further investigation. Moreover, further research is required to explore the impact of TMS in diverse contexts, using data collected from different areas and cultures (Bhutto *et al.*, 2021; Li *et al.*, 2017, Li *et al.*, 2019; Mehmood *et al.*, 2020). Thus, we explore the role of ITC specifically within the hospitality industry and conceived SP and SQ as the link between ITC and OP, representing an important precursor of super firm performance.

The present study investigates the mediating relationship of SP and SQ between ITC and OP to fill the existing gaps. Moreover, this study aims to examine the moderating effects of TMS, as the literature suggests that TMS is important for successful businesses. Therefore, an empirical study was conducted to address the following research questions in the present study: How does a firm's ITC improve OP in the hospitality industry? Do SP and SQ mediate the relationship between the ITC and OP of hospitality firms? Does TMS moderate the relationship between ITC and OP?

In brief, this study is a novel work that proposes a conceptual framework see (Figure 1) to fill the highlighted research gaps and contributes to the ITC and OP literature. First, this study provides significant insights into how ITC are related to OP from the underlying mechanisms of SP and SQ using the RBV theory. Second, it contributes to the existing hospitality literature by examining the moderating role of TMS. Last, from a managerial perspective, the present study offers practical implications that may support service

organizations to leverage their ITC to improve SP and SQ, thus helping achieve optimal performance.

2. Theoretical background and hypotheses development

2.1 IT capabilities and organizational performance

The RBV states that a firm develops a competitive advantage by acquiring, developing, combining and effectively deploying its physical, human and organizational resources and capabilities in valuable ways, not substitutable and difficult for competitors to imitate (Barney, 1991; İpek and Tanyeri, 2021; Jiao *et al.*, 2020). In the RBV sense of this research, ITC are the firm's ability to effectively leverage its tangible and intangible technological and personal resources to create a competitive advantage (Barney, 1991; Giua *et al.*, 2021). These complimentary resources represent the backbone of RBV in the firm context and explain how ITC have, to a large extent, prevailed over its paradoxical nature and can help improve business value (Binder, 2019; Santoro *et al.*, 2018). Thus, the RBV theory has been widely used to provide an appropriate theoretical lens to examine how companies' internal factors can make a difference leading to competitive advantage (Akram *et al.*, 2018; Barney, 1991; Rhou and Singal, 2020). Therefore, RBV has been the predominant theory for many years in the literature about management information systems and is still a key element in IT research. The present study contributes to this context by using the RBV theory from the perspective of Debnath's (2020) systematic review, which reported that organizations' capabilities are considered sustainability-improvement enablers and impact several sustainability elements. Additionally, recent studies have employed this theory to analyze ITC and SP factors (Rhou and Singal, 2020).

Today, organizations seek to become more active during technological turbulence and incorporate various ITC to navigate unforeseen situations (Bresciani *et al.*, 2021; Cheng *et al.*, 2021; Omar *et al.*, 2019). ITC support a sustainable competitive advantage that significantly impacts OP (Akram *et al.*, 2018); it obtains real-time data using embedded contemporary technologies (Khanra *et al.*, 2020). Scholars argue that firms should continuously predict the threats and opportunities regarding the market to maintain or enhance their existing performance (Chen and Tsou, 2012; Majid *et al.*, 2019; Mehmood *et al.*, 2017). Previous research has established various links between ITC and various performance measures. For instance, Lyver and Lu (2018) suggested that IT affects firms in other ways, including product innovation performance. According to Ajamieh *et al.* (2016), IT integration is critical in assisting supply chain management to improve OP. Another study found that ITC have a specific impact on IT performance (Raymond *et al.*, 2019). Thus, the following hypothesis is postulated:

H1. ITC have a positive relationship with OP.

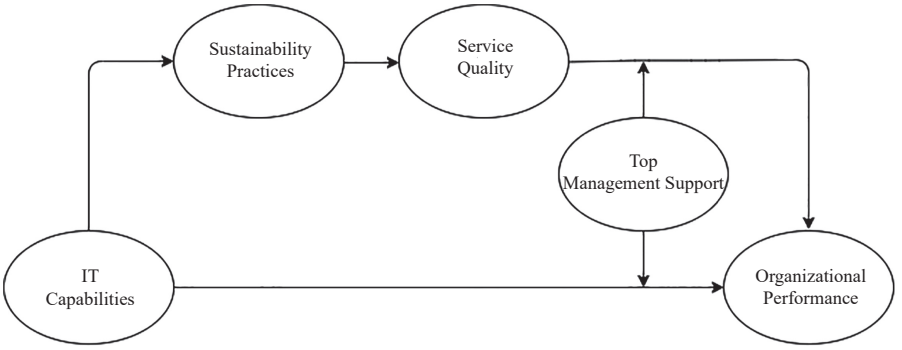

Figure 1.
Conceptual model of the study

2.2 IT capabilities, sustainability practices, service quality and organizational performance

Information technology is considered a sustainability-improvement enabler that impacts various sustainability elements, including economic, environmental and social (Thöni and Tjoa, 2017). It can affect firm performance through green supply chain management (Ajamieh *et al.*, 2016). Thus, companies pioneering in integrating sustainability activities can achieve superior performance and ultimately achieve competitive advantages. SP holistically consider the triple-bottom-line at which the firm can use and retain its resources and capabilities to meet enterprise needs (Akram *et al.*, 2018). For instance, ITC could incorporate environmental SP across multiple industries by effectively sharing information (Ajamieh *et al.*, 2016). Furthermore, ITC foster the utilization of resources to implement sustainability (Anthony *et al.*, 2019). Ajamieh *et al.* (2016) and Anthony *et al.* (2019) highlighted the importance of ITC as a potential factor in enabling SP in firms. Essentially, the sustainability perspective assumes a balance between social characteristics, environmental conditions and economic opportunities, demonstrated by the formulation of long-term plans (Elkington, 1998). Companies with sustainability initiatives can improve OP in terms of income, profit and tax (Zhu *et al.*, 2012) and manage customers' welfare by adopting total quality management (Benavides-Velasco *et al.*, 2014). Explaining the role of SP in business operations in the hospitality industry, Cvelbar and Dwyer (2013) affirmed the vital role of SP in improving the financial performance of companies by effective planning of strategies and focusing on their customer needs.

Given that consumers are increasingly advocating sustainability (Kushwah *et al.*, 2019; Mehrajunnisa *et al.*, 2021), companies are also integrating SP into their business operations to help them compete (Arya *et al.*, 2021; Wang, 2016). Therefore, improving SQ is critical in the hospitality industry as it can positively impact OP through the necessary actions being taken (Lari *et al.*, 2020; Liat *et al.*, 2014). SQ is considered an organization's ability to innovate (create new services or products) or improve the current service or product to strongly influence customer satisfaction, leading to customer loyalty (Tang, 2016). However, prior studies have revealed an increasingly large customer segment that favors sustainability in evaluating SQ (Wattanakamolchai *et al.*, 2016) and the critical role of the government in developing a comprehensive approach for SP (Dhir *et al.*, 2020). According to Wattanakamolchai *et al.* (2016), SP contribute to SQ improvement, thus emphasizing consumers' increasing consciousness of sustainability alongside SQ. However, there is a strong commitment to economic sustainability while neglecting environmental and social sustainability components in the hospitality industry (Cvelbar and Dwyer, 2013). Committing to SP helps organizations create firm-level value in the hospitality industry by applying service standards that depend on the favorable positioning of its products and services compared to its competitors (Chen and Barrows, 2015). The value of SP in terms of an organization's success is directly determined by the appropriate positioning of its products and services in comparison to those of its competitors.

Prior studies have shown that high SQ levels are linked to high-performance levels (Bernal *et al.*, 2021; Lai *et al.*, 2018; Navimipour *et al.*, 2018). Benavides-Velasco *et al.* (2014) also considered SQ a vital prerequisite for business success that allows an organization to gain customer loyalty and satisfaction, leading to greater profitability and productivity. Based on an empirical study conducted in the hotel industry, Liat *et al.* (2014) revealed that SQ is strongly associated with firm performance and directly impacts long-term business growth. Therefore, improving SQ in the hospitality industry to support business performance is also key (Tang, 2016). In this sense, Cvelbar and Dwyer's (2013) study indicates that new product delivery and service development practices should meet customer needs, an essential factor that enhances the financial and strategic performance of any hospitality organization, now and in the future. Additionally, the development of high-quality products and services in the

hospitality industry can support and improve competitiveness (Benavides-Velasco *et al.*, 2014; Li and Mehmood, 2019; Shang *et al.*, 2021).

Few studies have been conducted on ITC, SP and SQ in the hospitality industry, as most are shown in other contexts. For example, by examining performance analysis, Babu *et al.* (2018) used a questionnaire with hotel managers to understand the relationship between the importance of SP concerning the service supply chain members. According to the results, the perception of SP within the business and the hotel manager's opinion of these practices differs. However, achieving a long-term competitive advantage is the most serious concern. Information systems infrastructure and green culture have favorable direct impacts on SQ through service innovation (Khan and Khan, 2021; Khan *et al.*, 2021; Mehmood and Hussain, 2018; Yang *et al.*, 2017). Radu (2016) created a synthesized Green IS framework to achieve solid environmental sustainability in organizations. They discovered that meeting customer requirements through the consumption of a good or service may impact business performance.

The quality of products and services is considered a key measure of the improved OP when individuals anticipate the technology's ability to provide accurate and timely information (Chen and Tsou, 2012; Lari, Jabeen *et al.*, 2020; Talwar *et al.*, 2020). Although previous studies by Rhou and Singal (2020), Aktin and Gergin (2016) and Debnath (2020) address organizations' SP, there is a lack of consensus among the studies on the ITC-SP relationship, highlighting the need to explore this research area.

The study, therefore, hypothesizes that:

H2. ITC have a positive relationship with SP.

H3. SP are positively related to SQ.

H4. SQ has a positive relationship with OP.

Rhou and Singal (2020) reported that tourists' concern with environmental and social responsibilities, although well-intentioned, does not affect purchase intention; instead, SQ, price and the physical attractiveness of hospitality firms are the key influencers. Thus, organizations compete in today's challenging market conditions to generate new products and services, and knowledge (Michelino *et al.*, 2019) and to create positive social and environmental changes (Omar *et al.*, 2019) at prices comparable to service levels to convince customers (Arun *et al.*, 2021).

Leal-Millán *et al.* (2016) found that ITC have an indirect effect on green innovation. Creating and analyzing innovative products and services using advanced information technology plays a dominant role in improving OP (Chan and Wang, 2012). Hence, there is a connection between the use of technology and SQ (i.e. innovation and improvement). ITC play a crucial role in enhancing SQ (Debnath, 2020). Prior literature has found that SQ affects OP and is influenced by ITC (Chan and Wang, 2012) and SP (Albort-Morant *et al.*, 2016). Currently, there is consensus that the increasing focus on sustainability is altering the competitive landscape, forcing organizations to adopt robust environmental policies, community, customers, employees and products (Botha, 2016). Thus, technological solutions in the hospitality context can be exploited to improve profitability, productivity and SQ (Khan *et al.*, 2021; Mandić and Praničević, 2019) to alter the perception of SP. The potential mediating role of SP and SQ in the hospitality industry on these links is not sufficiently presented in the literature. The relevance of SP and SQ – utilizing ITC – in improving OP is required to be further investigated. Given these considerations, the following hypotheses are proposed:

H5. SP meditate the positive relationship between ITC and OP.

H6. SQ meditates the positive relationship between ITC and OP.

H7. SP and SQ sequentially mediate the positive relationship between ITC and OP.

2.3 Moderating effects of top management support

TMS is expected to moderate the relationship between ITC, SQ and OP for the following two reasons. First, prior literature supports a significant association between TMS and ITC in increasing competitiveness (Birkel *et al.*, 2019; Kanchanabha and Badir, 2021). Strong commitment from managers provides a governance mechanism to promote and support unique capabilities for any organization (Khan *et al.*, 2020; Majid *et al.*, 2019). Furthermore, firms can create a supportive management atmosphere to inspire employees to participate in training programs or interact with customers, resulting in employees receiving useful feedback. This feedback will help the firm understand the real needs and alter services or products to enhance their performance (Li and Liu, 2018). In other words, ITC are highly correlated with OP when TMS is more likely to manage it. Given the ability of organizations to benefit from IT investments, the importance of TMS has been recognized and documented. Thus, managers ensure the effective implementation of IT and control the budget to foster OP.

Second, the literature highlights the vital role of top management in determining better customer service to improve firm innovativeness, considered a firm-level asset strongly linked to improved OP (Khan *et al.*, 2021; Ruiz-Palomino *et al.*, 2019). Therefore, managers encourage their employees to develop new ideas and initiatives in hospitality management, such as creating internal service improvements or new service developments (Dai *et al.*, 2015). TMS is considered an important element in achieving SQ through innovation in hospitality and tourism firms (Tang, 2016). Thus, employees tend to increase their efforts to achieve desirable goals when supported by their top management. Kanwal *et al.* (2017) argued that OP is positively affected when managerial control is coupled with TMS.

Therefore, it is expected that SQ will decrease when top management reduces its commitment. Employees provide high levels of SQ due to their manager's support. When ITC efforts are undertaken within an organization, employees are expected to demonstrate greater efforts toward SQ. Thus, the following hypotheses are proposed:

H8. TMS moderates the relationship between ITC and OP, with the relationship being stronger when TMS is at a high level.

H9. TMS moderates the relationship between SQ and OP with the relationship being stronger when TMS is at a high level.

We propose a mediated moderation model in which SQ mediates the positive association between ITC and OP, and TMS moderates the association in the ITC-OP relationship. Furthermore, following Edwards and Lambert (2007), one can infer that the moderating variable also moderates the strength of the mediation effect of SQ in the ITC-OP relationship. Therefore, we propose the following hypothesis.

H10. TMS moderates the mediating effect of SQ on the relationship between ITC and OP, such that the mediating effect is stronger when TMS is at a higher level than when TMS is low.

3. Methodology

3.1 Sample and procedures

Data were collected from hotels located in the northwest region of the UAE. We contacted 600 legally licensed hotels in the UAE and selected hotels for several reasons. In practice, the hotel

industry plays a key role in the UAE's long-term sustainability plans, a role that is likely to continue (Jabeen *et al.*, 2020; Wijethilake, 2017). Reportedly, hotels earned revenue of Dh11.3bn ($3.08bn) from Dh8.6bn in the six months recorded a year earlier (Kamel, 2021). This amount is expected to rise by an estimated 5.1% annually during 2017–2027 to AED116.1bn (USD31.6bn) or 5.4% of the country's GDP by 2027. Hotels in the UAE were chosen as study samples as the UAE has been leading the way in transitioning to sustainability to become a world leader in, for example, becoming a green, low-carbon economy. However, hotels in the UAE are among the most energy-consuming globally, accounting for over 70% of the energy consumption in the UAE (EmiratesGBC, 2016).

Three waves of data collection at three-week intervals were conducted to avoid common method bias (Begum *et al.*, 2020; Khan, 2021a, b; Mehmood *et al.*, 2021; Podsakoff *et al.*, 2003; Ullah *et al.*, 2021; Yu *et al.*, 2021). In the first wave (T1), a survey was conducted with 600 managers. A total of 580 completed questionnaires were returned (response rate: 96.6%). Managers were asked to complete demographic information and questions regarding ITC and TMS. The second-wave survey (T2) took place three weeks later; the 580 participants were asked to report their SP and SQ. The number of usable responses returned was 550 (94.8% response rate). In the third-wave survey (T3), managers were asked to complete questions regarding OP and TMS, with 507 valid responses received (92.1% response rate). The study sample comprised 69.6% men and 30.4% women. Respondents' average age was 31 years, almost 50% of managers had a bachelor's degree, and the average organizational tenure of respondents was six years.

3.2 Measures

The questionnaires utilized scales adapted from previous studies for the constructs under study, along with demographic variables. All study variables were assessed using a five-point Likert scale (1 = strongly disagree; 5 = strongly agree) for all items except TMS (1 = not supportive; 5 = very supportive). The original questionnaire was developed in English and then translated into Arabic using the back-translation method (Brislin, 1980). The details of the scales used were as follows:

(1) *IT capabilities*: A 27-item scale was used to assess ITC ($\alpha = 0.93$) drawn from Fink (2011). [sample item: "The hotel's IT unit provides a wide range of security and risk management services (security policies, disaster planning, firewalls)" and "The hotel's IT personnel are skilled in multiple structured programming, CASE methods, or tools"].

(2) *Sustainability practices*: To measure SP ($\alpha = 0.91$), we used a 12-item scale developed by Wijethilake (2017). [sample item: "Our hotel minimizes the environmental consequences of products and services" and "Our hotel is ensuring the health and safety of employees"].

(3) *Service quality*: We used a seven-item scale to measure SQ ($\alpha = 0.88$), developed by Tang (2016) [sample item: "Our hotel usually generates new service ideas"].

(4) *Top management support*: A five-item scale was used to measure TMS ($\alpha = 0.90$), adapted from Byrd and Davidson (2003) [sample item: "The top management in our hotel cultivates information technology project champions"].

(5) *Organizational performance*: A five-item scale was adapted from Queiroz *et al.* (2018) to measure OP ($\alpha = 0.85$) [sample item: "We are able to increase sales growth than other hotels"].

4. Results

4.1 Data analysis

As per the objectives of this research and the proposed model, data analysis is performed by employing hierarchical regression and PROCESS macro. Based on the guidelines provided by Hair *et al.* (2010), the data were first put through evaluating the outer and inner measurements, and then the hypotheses testing was performed. The Kaiser–Meyer–Olkin (KMO) sample adequacy indicator was 0.85 (much higher than the minimum threshold of 0.5, confirming the adequacy of the sample size (Hair *et al.*, 2010).

4.2 Descriptive statistics

Table 1 shows the correlations between the study constructs, predictor and dependent variables' standard deviations, internal reliabilities and means. We examined the data for multicollinearity, outliers and normality. ITC were positively correlated with SP ($r = 0.43$, $p < 0.001$), SQ ($r = 0.56$, $p < 0.001$), TMS ($r = 0.39$, $p < 0.001$) and OP ($r = 0.44$, $p < 0.001$). Hence, we can further analyze our hypotheses, as these correlations are supported.

4.3 Confirmatory factor analysis (CFA)

Hu and Bentler (1999) cut-off criteria (i.e. χ^2/df less than 2; TLI, GFI, NFI, CFI greater than 0.90 and RMSEA less than 0.07) were used to test the measurement model regarding convergent and discriminant validity. We conducted a CFA to determine whether the measurement model captured distinct variables. As shown in Table 2, the proposed five-factor model showed a good fit to the data (see Table 2): χ^2/df = 973.399/620 = 1.570, GFI = 0.909, NFI = 0.918, CFI = 0.968, TLI = 0.964, and RMSEA = 0.034. To check the discriminant validity of the hypothesized five-factor model, we compared it with four alternative models that did not produce good fits, indicating discriminant validity. The factor loadings (λ: cut-off criteria greater than 0.60 and $p < 0.01$) were above 0.840, and all observed items showed significant loadings on their related factors. We also assessed the average variance extracted (AVE; cut-off criteria >0.50) and composite reliability (CR; cut-off criteria >0.80), which supported convergent validity (see Table 1). Hence, the proposed model is deemed suitable for hypotheses testing.

4.4 Hypotheses testing

We initially conducted regression with a bootstrapping procedure to test direct relationships (H1, H2, H3, H4), and moderation relationships (H8, H9), subsequently adding separate steps along with gender, age, tenure, education (control variables), ITC (independent variable), moderator (TMS), dependent variable (OP) and interactions (Table 3: Models 1–13). We then tested the indirect effect to test H5, H6 and H7 by using PROCESS macro model-6 (see Table 4). We concluded by testing H10 using the PROCESS macro model-14 (see Table 5).

4.4.1 Analysis of direct relationships between IT capabilities, sustainability practices, service quality and OP. As shown in Table 3, H1 posited that ITC are positively associated with OP (Model 8: $\beta = 0.45$, $p < 0.001$), supporting H1. Meanwhile, H2 regarding ITC was positively related to SP (Model 2: $\beta = 0.46$, $p < 0.001$) and H3 regarding SP positively associated with SQ (Model 5: $\beta = 0.33$, $p < 0.001$) are also supported, as H4 regarding SQ being positively related to OP (Model 11: $\beta = 0.58$, $p < 0.001$).

4.4.2 Analysis of sustainability practices and service quality as mediators between IT capabilities and organizational performance. The findings related to the study's mediation models (H5, H6 and H7) confirm the predictions. Preacher *et al.*'s (2007) approach for determining significant indirect effect path was followed to test the mediation effects. The mediation hypothesis is accepted when the indirect impact is significant, implying that its

Table 1.
Descriptive statistics, reliabilities and correlation matrix

	Mean	SD	AVE	CR	1	2	3	4	5	6	7	8	9	10
1. Gender	1.3	0.46	–	–	–									
2. Age	2.24	0.77	–	–	−0.04									
3. Education	2.15	0.68	–	–	−0.01	0.19**								
4. Tenure	1.99	0.75	–	–	0.22**	0.41**	0.13**							
5. Firm size	2.06	0.90	–	–	0.07	0.01	0.02	0.03						
6. IT capabilities	3.82	0.68	0.501	0.933	0.02	0.03	0.04	0.08	0.05	(0.93)				
7. Sustainability practices	3.89	0.75	0.560	0.910	0.03	0.08	0.03	0.13**	0.06	0.43**	(0.91)			
8. Service quality	3.97	0.71	0.564	0.886	0.07	0.06	0.01	0.21**	0.01	0.56**	0.53**	(0.88)		
9. Top management support	3.84	0.85	0.645	0.901	0.02	0.15**	0.03	0.22**	0.08	0.39**	0.52**	0.47**	(0.90)	
10. Organizational performance	3.95	0.71	0.538	0.853	0.11**	0.13**	0.01	0.26**	0.02	0.44**	0.46**	0.61**	0.52**	(0.85)

Note(s): $N = 507$; $p < 0.05$; *$p < 0.01$; **$p < 0.001$; AVE = average variance extracted; CR = composite reliability. Cronbach's α values appear in parentheses on the diagonal

Model	χ^2	*df*	χ^2/df	$\Delta\chi^2$ (Δdf)	GFI	NFI	TLI	CFI	RMSEA
Five-factor model	973.399	620	1.570		0.909	0.918	0.964	0.968	0.034
Four-factor model: combining SP and SQ	2164.543	630	3.407	1191.144 (10)	0.804	0.818	0.848	0.864	0.069
Three-factor model: combining SP, TMS and SQ	2627.936	630	4.171	1654.537 (10)	0.761	0.778	0.799	0.820	0.079
Two-factor model: combining ITC, SP, TMS and SQ	3626.999	630	5.757	2653.60 (10)	0.647	0.693	0.699	0.730	0.097
Single-factor model	3789.746	631	6.015	2816.347 (11)	0.630	0.679	0.683	0.716	0.100

Note(s): $^{**}p < 0.001$; $N = 507$. GFI = goodness of fit index; CFI = comparative fit index; TLI = Tucker–Lewis index; NFI = normed fit index; RMSEA = root-mean-square error of approximation; ITC = IT capabilities; SP = sustainability practices; SQ = service quality; TMS = top management support; OP = organizational performance

Table 2. Results of confirmatory factor analyses (CFAs) for the measures of the variables studied

empirical confidence interval does not involve zero (Zhao *et al.*, 2010). A bootstrapping procedure with 5,000 subsamples was performed using Preacher and Hayes (2008) approach to compute significant values and confidence intervals. We calculated the 95% confidence interval for indirect effects. H5 suggested that SP mediate the positive relationship between ITC and OP. As shown in Table 4, when the SP factor was added as an exclusive mediator between ITC and OP, the results revealed a significant and indirect effect of ITC on OP via SP ($\beta = 0.146$, SE = 0.03, $p < 0.05$, 95% CI [0.0825, 0.2284]), thus supporting H5. Similarly, H6 posited that SQ mediates the positive relationship between ITC and OP. As shown in Table 4, when the SQ factor was added and where SP were absent, the analysis showed a significant and indirect impact between ITC and OP via SQ ($\beta = 0.304$, SE = 0.04, $p < 0.05$, 95% CI [0.2199, 0.4007]), supporting H6.

Additionally, when both mediators were added to the model, the analysis showed a significant and indirect effect of the sequential mediating impact between ITC and OP through SP and SQ ($\beta = 0.0725$, SE = 0.0177, $p < 0.05$, 95% CI [0.0419, 0.1100]), thus supporting H7. These results support H5, H6 and H7, revealing that ITC enhance SP and SQ, positively related to OP.

4.4.3 Analysis of top management support as a moderator. H8 posited that TMS moderates the relationship between ITC and OP, with the association being stronger when TMS levels are high. As shown in Table 3, the interaction between ITC and TMS was significant and positively related to OP (Model 10: $\beta = 0.13$, $p < 0.001$). We also visually assessed the moderating effect pattern following Aiken and West (1991) to plot the interaction. Figure 2 shows that the association between ITC and OP becomes stronger at higher levels of TMS, supporting H8.

For H9, the moderation of TMS on the SQ-OP relationship, the interaction between SQ and OP was positively related to TMS (Table 3, Model 13: $\beta = 0.18$, $p < 0.001$). Again, we visually assessed the moderating effect patterns to plot the interaction. The interactions between ITC and OP at two TMS levels (±1 SD) are shown in Figure 3. Further, Table 5 shows a stronger positive effect of SQ and TMS on OP when it is high ($\beta = 0.37$, $p < 0.05$) than when it was low ($\beta = 0.08$, not significant). These findings show that TMS reinforces the SQ-OP relationship, thus supporting H9.

4.4.4 Analysis of top management support as a moderator for the mediating role of service quality. H10 posited that TMS moderated the indirect relationship between ITC and OP through SQ. Following Edwards and Lambert (2007), we used a moderated path analysis to

Table 3.
Results of hypothesis testing

	Dependent variables												
	SP			SQ					OP				
	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13
Variable	β (SE)	β (SE)	β (SE)	β (SE)	β (SE)	β (SE)	β (SE)	β (SE)	β (SE)	β (SE)	β (SE)	β (SE)	β (SE)
Constant	3.59***	1.19***	3.719***	1.637***	1.312***	3.655***	2.179***	2.02	1.514***	1.052	1.508***	1.188	1.05
	(0.19)	(0.24)	(0.18)	(0.2)	(0.12)	(0.18)	(0.2)	(0.21)	(0.2)	(0.21)	(0.19)	(0.19)	(0.47)
Gender	0.01	0.02	0.04	0.03	0.03	0.09	0.06	0.09	0.11	0.08	0.07	0.09	0.05
	(0.07)	(0.06)	(0.07)	(0.06)	(0.05)	(0.07)	(0.06)	(0.06)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)
Age	0.04	0.06	0.02	0.01	0.02	0.03	0.02	0.05	0.01	0.01	0.04	0.01	0.02
	(0.04)	(0.04)	(0.05)	(0.03)	(0.03)	(0.04)	(0.04)	(0.03)	(0.03)	(0.03)	(0.04)	(0.03)	(0.03)
Education	0.07	0.07	0.03	0.02	0.04	0.04	0.01	0.04	0.02	0.02	0.02	0.02	0.03
	(0.05)	(0.05)	(0.04)	(0.03)	(0.04)	(0.04)	(0.05)	(0.04)	(0.03)	(0.03)	(0.04)	(0.04)	(0.04)
Tenure	0.13*	0.08	0.21***	0.16***	0.13	0.23***	0.17***	0.18***	0.13**	0.13**	0.11**	0.08*	0.09*
	(0.05)	(0.06)	(0.05)	(0.04)	(0.04)	(0.05)	(0.04)	(0.04)	(0.04)	(0.04)	(0.03)	(0.04)	(0.03)
Firm size	0.06	0.04	0.01	0.02	0.04	0.01	0.03	0.03	0.02	0.03	0.01	0.01	0.02
	(0.03)	(0.04)	(0.03)	(0.03)	(0.02)	(0.03)	(0.02)	(0.03)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
ITC		0.46***		0.57***	0.42***			0.45***	0.30***	0.49***			
		(0.05)		(0.04)	(0.04)			(0.04)	(0.04)	(0.07)			
TMS									0.32***	0.53***		0.24**	0.67***
									(0.03)	(0.08)		(0.03)	(0.09)
IT*TMS										0.13***			
										(0.04)			
SP					0.33***		0.41***						
					(0.03)		(0.03)						
SQ											0.58***	0.44***	0.72***
											(0.03)	(0.03)	(0.07)
SQ*TMS													0.18***
													(0.03)
R^2	0.027	0.200	0.048	0.345	0.442	0.074	0.256	0.309	0.36	0.415	0.388	0.452	0.579
ΔR^2		0.173		0.297	0.097		0.182	0.053	0.051	0.055	0.314	0.064	0.127
F	2.73*	108.10***	5.084***	226.333***	87.119***	8.022***	122.375**	120.690**	91.921**	12.279***	256.657**	57.762***	25.590**

Note(s): $N = 507$; *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$. β = unstandardized coefficients; SE = standard error; ITC = IT capabilities; SP = sustainability practices; SQ = service quality; TMS = top management support; OP = organizational performance

analyze H10. Table 5 and Figure 3 indicate that the indirect effect of ITC on OP by SQ is significant at high levels of TMS (0.37, 95% CI, LL = (0.0502, UL = 0.2231)] but not significant at low levels of TMS (0.08, not significant). Additionally, zero was not included in the moderated-mediation index (Index: 0.0748, Boost SE = 0.025, 95% CI (0.0253, 0.1253)]; however, the effect of TMS on the indirect effect was significant. Therefore, TMS moderated the indirect relationship between ITC and OP through SQ, as predicted in H10.

IV	MV	DV	Effect of IV on *M* (a)	Effect of M on DV (b)	Indirect effect (a*b)	Total effects (c')	Total effects (c)	95% CI	Supported
ITC	SP	OP	0.469	0.312	0.146	0.314	0.461	[0.0825, 0.2284]	Yes
ITC	SQ	OP	0.581	0.523	0.304	0.156	0.461	[0.2199, 0.4007]	Yes

Note(s): IV = ITC; DV = OP; MV = SP, SQ; ITC = IT capabilities; SP = sustainability practices; SQ = service quality; TMS = top management support; OP = organizational performance; IV = independent variable; MV = mediating variable; DV = dependent variable

Table 4. Regression results of mediation through bootstrapping method

	Coeff	S.E	95% CI LL	95% CI UL
Direct effect of ITC on OP	0.45*	0.039	0.0277	0.1832
Indirect effect of ITC on OP through SQ	0.30*	0.046	0.2199	0.4007
Conditional indirect effect of ITC on OP at values of TMS (Hypothesis 10)				
Low TMS (−1 SD)	0.08	0.039	−0.0147	0.3607
High TMS (+1 SD)	0.37*	0.043	0.0502	0.2231

Note(s): CI = confidence interval; LL = lower limit CI; UL = upper limit CI; ITC = IT capabilities; SP = sustainability practices; SQ = service quality; TMS = top management support; OP = organizational performance. $N = 507$; $*p < 0.05$

Table 5. Results for conditional indirect effect at value of top management support

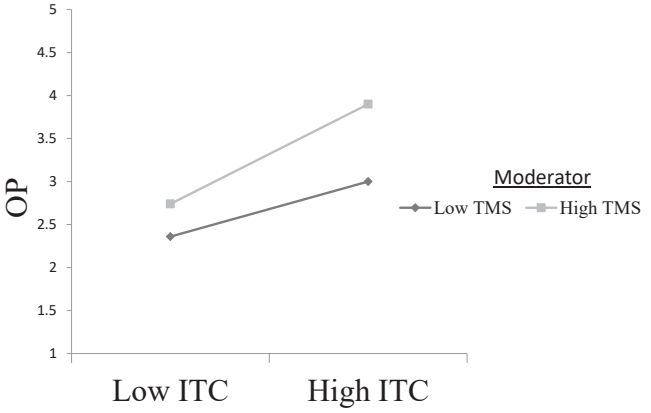

Figure 2. Interactive effects of IT capabilities (ITC) and top management support (TMS) on organizational performance (OP)

5. Discussion and conclusions

This study's findings confirm the hypotheses related to the relationships among ITC, SP, SQ, TMS and OP, establishing the previous conceptualizations that drew on the RBV to argue that ITC can achieve superior performance (Akram *et al.*, 2018; Bharadwaj, 2000). This study finds empirical support to emphasize the importance of ITC in supporting OP, consistent with the IT framework proposed by Lyver and Lu (2018), explaining the importance of adapting ITC to help companies achieve competitive advantage by expecting a positive impact on firm performance. The results are in alignment with prior study findings of Ajamieh *et al.* (2016) who affirmed the importance of ITC on sustainability. Furthermore, the results showed that SP are positively related to SQ, further confirming the importance of SQ in the evaluation of the overall OP. These results are consistent with previous studies (Liat *et al.*, 2014; Tang, 2016; Wattanakamolchai *et al.*, 2016).

The results from the time-lagged design show that SP mediate the ITC-OP relationship, and SQ mediates that of ITC and OP. The same was found in previous studies (e.g. Chan and Wang, 2012; Leal-Millán *et al.*, 2016). TMS, the moderating variable, strengthens the relationship between ITC and OP between SQ and OP. Additionally, TMS moderates the mediating effect of SQ on the relationship between ITC and OP. The mediating effect is stronger when TMS is at a higher level than for those with low levels of TMS. These results confirm the results of previous studies (Birkel *et al.*, 2019; Kanchanabha and Badir, 2021).

5.1 Theoretical implications

This study makes several theoretical contributions. First, it extends the existing hospitality literature by exploring the complex relationships among ITC, SP, SQ, TMS and OP. Second, drawing on the RBV theory, our findings confirm the role of SP and SQ in the ITC-OP relationship. This study also adds new insights to SQ and sustainability research in the hospitality sector, as emphasized by prior researchers (e.g. Agyeiwaah, 2019; Müller and Pfleger, 2014). According to the RBV, organizational capabilities in IT reside in tacit knowledge, hard for opponents to imitate. Therefore, developing sustainability and SQ can be seen as a specific strategy to maintain a competitive advantage. Our findings extend the literature as the hypotheses were developed based on the assumption that ITC affect OP (Ajamieh *et al.*, 2016); employing SP and SQ can help create new benefits within the hospitality industry (Benavides-Velasco *et al.*, 2014). This study's findings contribute to the hospitality literature, given the dynamic competitive scenario of this industry.

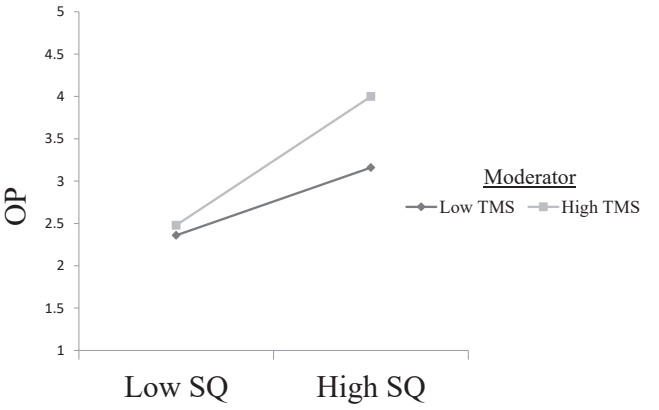

Figure 3.
Interactive effects of service quality (SQ) and top management support (TMS) on organizational performance (OP)

Finally, few studies have investigated ITC, SQ and OP concurrently in the context of the hospitality industry (Ruiz-Palomino *et al.*, 2019); therefore, this study fills a significant research gap and adds to the literature by demonstrating the crucial role of TMS in ITC, in improving SQ and in achieving OP. A strong management commitment to ITC fosters good practices in SQ (enhancing existing services and developing new ones) (Dai *et al.*, 2015), with relatively high chances of improved performance (Kanwal *et al.*, 2017). This approach contributes to the literature by proposing that TMS ensures continuous performance through the ITC and SQ.

5.2 Practical implications

This study offers implications for managers and policymakers in the hospitality industry. First, a significant recommendation is that hotel managers focus on improving their SP using ITC. Therefore, organizations that pursue better performance should invest more in ITC, strengthen their competitiveness in SP and create a better image. SP such as recycling, remanufacturing and energy efficiency enable cost savings and achieve profit in the long term. Second, our model identifies that ITC are critical for hotels' development to compete and succeed in digitally enabled business environments. Hence, the hotel industry needs to focus on its core strength in ITC. Third, we propose that the hospitality industry focuses on the capabilities that influence firm performance via strategic activities, such as SP and SQ. Investments should not be made in IT resources only, instead of providing the required ITC to coordinate better with suppliers and customers in executing sustainable activities and SQ. Furthermore, hotel managers can use ITC to create awareness about various sustainability initiatives. Additionally, hotels must address their needs and preferences differently for SP that might oppose their SQ. Fourth, managers in hospitality firms need to emphasize SP to comply with government rules and incorporate ITC into service innovation and improvement. Finally, the findings serve as a guideline for managers to facilitate ITC by playing a leading role in improving SQ. Firms should use technologies and tools that allow employees to share and exchange best practices in sustainability without compromising service improvement and innovation. Thus, managers should prioritize ITC when selecting and designing compliant methods that satisfy customer needs and desires to help ensure improved delivery and service customizations.

5.3 Limitations and future research

Our study has several limitations. First, the data were collected from a single industry located in the northwestern region of the UAE; hence, it cannot be generalized to other industries and national contexts. Second, although our data were collected from hotels, considered an adequate setting for the hospitality industry in terms of studying sustainability and SQ, further studies may broaden the scope to include different geographical areas, cultures or times to increase the generalizability of the model. Further research should consider SQ as an individual or organizational-level indicator to verify whether there is any difference in its effect.

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