

Article

The Effect of Electronic Human Resource Management Systems on Sustainable Competitive Advantages: The Roles of Sustainable Innovation and Organizational Agility

Khalid Alqarni ¹, Mohamed Fathy Agina ^{2,3,4,*}, Hazem Ahmed Khairy ⁵, Bassam Samir Al-Romeedy ⁶,
Dalia Abdelrahman Farrag ⁷ and Rabab Mahmoud Abdallah ⁸

¹ Management Information Systems Department, Faculty of Economics and Administration, King Abdulaziz University, Jeddah 21589, Saudi Arabia; khalqarni@kau.edu.sa

² Hotel Management Department, Higher Institute for Specific Studies, Heliopolis, Cairo 11771, Egypt

³ Faculty of Management, Midocean University, Fujairah P.O. Box 51124, United Arab Emirates

⁴ Business Administration Department, Faculty of Business Administration, Stardom University, 34510 Istanbul, Turkey

⁵ Hotel Management Department, Faculty of Tourism and Hotels, University of Sadat City, Sadat City 32897, Egypt; hazem.khaiery@fth.usc.edu.eg

⁶ Tourism Studies Department, Faculty of Tourism and Hotels, University of Sadat City, Sadat City 32897, Egypt; bassam.samir@fth.usc.edu.eg

⁷ Management & Marketing Department, College of Business & Economics, Qatar University, Doha 2713, Qatar; dfarrag@qu.edu.qa

⁸ Finance Department, College of Management, Economics and Information Systems, Misr University for Science and Technology, 6th of October, Giza 12573, Egypt

* Correspondence: mohamadfathy.eg@gmail.com

Abstract: This study attempts to examine the impact of electronic human resource management (E-HRM) systems on achieving a sustainable competitive advantage (SCA) in the tourism and hospitality industry by incorporating sustainable innovation (SI) and organizational agility (OA) as mediators. To survive, tourist and hospitality organizations must embrace digital transformation by using E-HRM practices such as digital recruiting, online training, and performance management tools. Organizations may improve their HR departments' efficiency, effectiveness, and decision making, enhancing the overall organizational performance and preserving a sustainable competitive edge. Middle and first-line management of the five-star hotels and travel agencies in category A operating in Egypt were investigated. A PLS-SEM analysis was performed on 313 valid responses, gathered using WarpPLS 7.0. The findings revealed that E-HRM is positively associated with SCA, SI, and OA. Furthermore, there were positive associations between SI and OA and SCA. SI and OA were also shown to be mediators in the relationship between E-HRM and SCA. The study adds to the existing literature on how E-HRM impacts SI, OA, and SCA. The relationship between these components in hotels and travel agencies has not been the subject of any empirical research. The current study has addressed gaps by empirically analyzing these relationships in the context of Egyptian hotels and travel agencies. It integrates E-HRM, innovation, organizational agility, and competitive advantage within the context of sustainability in tourism and hospitality.

Keywords: electronic human resource management systems; sustainable competitive advantage; sustainable innovation; organizational agility



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1. Introduction

Tourism and hospitality businesses are service providers that rely heavily on human interaction [1]. Due to their labor-intensive nature, high employment rates, and reliance on natural resources, the tourism and hospitality sectors are even more vulnerable to the issue highlighted by the current study [2,3]. The tourism and hospitality industry is also

recognized as fast-paced and dynamic, requiring employees to tackle many problems while offering excellent customer service [4]. To improve employee outcomes in this setting, a work environment that fosters a positive working environment is essential, particularly within the Egyptian tourism and hotel industry, as this industry plays a significant role in enhancing the Egyptian economy.

Currently, in the ever-changing business environment, organizations are focused on attaining a sustainable competitive advantage to secure their long-term viability and success [5]. To achieve this advantage, organizations must consistently innovate, adjust to evolving market dynamics, and effectively harness their human resources. In this regard, the adoption and application of electronic human resource management (E-HRM) has been shown considerable interest due to its potential to enhance HR practices, foster sustainable innovation, and bolster organizational agility [6,7]. E-HRM refers to the integration of information technology systems with HR processes, aiming to optimize HR functions, increase efficiency, and align HR practices strategically with organizational goals. Through technology utilization, E-HRM equips organizations with tools to effectively handle employee data, automate HR processes, foster communication and collaboration, and facilitate decision making. The adoption of E-HRM holds the potential to influence various organizational outcomes, including the attainment of a sustainable competitive advantage [8].

E-HRM plays a crucial role in driving sustainable innovation by offering collaborative platforms, promoting knowledge sharing, and leveraging data analytics. These capabilities empower organizations to identify and capitalize on opportunities for sustainable enhancements. Moreover, E-HRM strengthens organizational agility by granting real-time access to information, facilitating effective communication and coordination, enabling agile decision making, and enabling swift responses to market dynamics and competitive pressures [9].

E-HRM has the potential to cultivate sustainable innovation within organizations by enhancing HR practices and facilitating effective knowledge management [10]. This, in turn, strengthens the organization's capacity to create and implement sustainable solutions that contribute to a sustainable competitive advantage. Likewise, E-HRM, through real-time information provision, improved communication, and support for agile decision making, can bolster organizational agility, thereby positively influencing an organization's sustainable competitive advantage [11].

Although the influence of E-HRM on sustainable competitive advantage has been examined across different sectors [12], there is a research gap concerning its specific implications within the tourism and hospitality industry. This gap pertains specifically to the interplay between E-HRM, sustainable innovation, and organizational agility as mediating factors in this industry context. In the tourism and hospitality industry, sustainable innovation holds significant importance [13]. Organizations in this sector aim to adopt environmentally friendly practices, provide sustainable products and services, and generate value through sustainability initiatives [14]. Nevertheless, there is a research gap concerning the mediating role of sustainable innovation in the association between E-HRM and sustainable competitive advantages, particularly within the tourism and hospitality industry. Gaining insights into how E-HRM fosters sustainable innovation within this industry is crucial for organizations to devise and execute strategies that enhance their sustainable competitive advantage.

The tourism and hospitality industry is known for its fast-paced nature, evolving customer preferences, and dynamic market conditions. In this context, organizational agility, which refers to the ability to respond to these changes swiftly and effectively, becomes vital for sustaining a competitive edge [15]. However, there is a dearth of research concerning the mediating role of organizational agility in the relationship between E-HRM and sustainable competitive advantage within the tourism and hospitality industry. Examining how E-HRM enhances organizational agility in this industry is crucial for organizations to successfully adapt and thrive amidst uncertainties and disruptions.

The primary objective of this study is to investigate the interconnectedness of E-HRM, sustainable innovation, organizational agility, and sustainable competitive advantage in

the tourism and hospitality industry. By considering these multiple constructs together, a holistic understanding of the intricate relationships and mechanisms involved can be achieved. While prior research has individually examined the links between these constructs, a research gap remains with regard to comprehensively exploring their combined effects, specifically within the context of the tourism and hospitality industry.

By addressing these research gaps, this study will make a valuable contribution to the existing literature by offering insights into the distinct implications of E-HRM on sustainable competitive advantage, sustainable innovation, and organizational agility within the tourism and hospitality industry. The findings will have practical implications for organizations operating in this industry, empowering them to strategically harness E-HRM to boost their competitive position, foster sustainable practices, and effectively navigate the ever-changing market dynamics.

More specifically, this study attempts to attain the following two research objectives:

- To measure the impact of E-HRM systems on sustainable competitive advantage.
- To explore the mediating roles of sustainable innovation and organizational agility in the relationship between E-HRM systems and sustainable competitive advantage.

2. Literature Review

2.1. *Dynamic Capabilities Theory*

Dynamic Capabilities Theory underscores the significance of an organization's capacity to adjust to evolving market dynamics and capitalize on emerging opportunities [16]. As a technological innovation, E-HRM has the potential to augment organizational agility by offering real-time data and valuable insights into human resources [17]. This enhanced agility empowers organizations to swiftly respond to labor market fluctuations, regulatory shifts, and emerging talent requirements, thereby fostering a sustainable competitive advantage [18]. Additionally, Dynamic Capabilities Theory highlights the significance of knowledge integration and learning as fundamental capabilities [19]. E-HRM plays a crucial role in facilitating the integration of HR-related data and analytics, enabling organizations to continuously learn and enhance their HR practices [20]. Such learning processes can pave the way for the development of sustainable innovation, including enhanced talent management strategies and more efficient recruitment processes [21].

Furthermore, Dynamic Capabilities Theory encompasses the process of reconfiguring an organization's resources and capabilities to address external changes effectively [16]. E-HRM is a valuable resource that can be flexibly reconfigured to align with evolving business strategies [22]. For instance, organizations can adapt their E-HRM systems to prioritize specific sustainability objectives, thereby fostering a sustainable competitive advantage through innovative HR practices [23].

Dynamic Capabilities Theory also recognizes the significance of agility in different organizational functions, including human resource management. E-HRM empowers HR departments to promptly adapt to fluctuating HR demands, such as remote work arrangements, evolving workforce demographics, or changing regulatory obligations. This agility facilitates organizational adaptation and fosters competitiveness [24].

Dynamic Capabilities Theory emphasizes the importance of ongoing improvement and innovation [25]. When effectively utilized, E-HRM enables organizations to enhance their HR practices, thereby fostering sustainable innovation. For instance, organizations can harness data analytics to optimize employee engagement, resulting in improved organizational performance [24].

2.2. *The Relationship between E-HRM and Sustainable Competitive Advantage*

E-HRM encompasses the utilization of technology, particularly information systems, to automate and streamline HR processes and activities within an organization [26,27]. Sustainable competitive advantage denotes an organization's capability to outperform competitors in the long run by creating and sustaining distinctive, valuable, and unique benefits [28]. E-HRM streamlines and automates various routine HR tasks, including

payroll processing, benefits administration, and employee record keeping. This automation reduces manual effort and enhances operational efficiency, enabling HR professionals to devote more time to strategic activities that contribute to gaining a competitive advantage [29]. Likewise, E-HRM facilitates the availability of real-time data and analytics, empowering HR professionals to make well-informed decisions. By analyzing workforce metrics, such as employee performance, turnover rates, and skills gaps, HR professionals can identify areas for enhancement and devise targeted HR strategies that align with organizational objectives [9].

E-HRM plays a crucial role in attracting and retaining high-caliber talent. It achieves this through various means, such as online job portals, applicant tracking systems, and automated screening processes, which streamline the recruitment process and result in a larger pool of qualified candidates. Moreover, E-HRM supports employee engagement and development by providing e-learning platforms, performance management systems, and career development tools. These initiatives contribute to increased employee satisfaction and retention rates [8].

E-HRM enables the adequate storage, retrieval, and sharing of HR-related knowledge and information. By providing centralized databases for employee profiles, training materials, policies, and procedures, it ensures convenient access to essential information. This effective knowledge management fosters organizational learning, innovation, and decision making, thereby contributing to achieving a sustainable competitive advantage [8,30]. A strategic alignment between E-HRM and an organization's overall business strategy is vital for achieving a sustainable competitive advantage. This alignment ensures that HR practices and technology harmonize with the organization's goals, values, and competitive positioning. By integrating E-HRM into strategic decision making processes, organizations can cultivate a workforce attuned to their strategic objectives, thereby fostering a sustainable competitive advantage [12,31]. Accordingly, the following hypothesis is proposed:

Hypothesis 1. *E-HRM positively affects sustainable competitive advantage.*

2.3. The Relationship between E-HRM and Sustainable Innovation

Sustainable innovation encompasses the creation and adoption of novel ideas, processes, products, or services that promote environmental, social, and economic sustainability [32,33]. E-HRM plays a role in fostering an innovative culture within organizations. It achieves this by offering collaborative platforms that facilitate knowledge sharing and idea generation, thereby promoting communication and interaction among employees. This encourages the exchange of innovative ideas, fosters creativity, and cultivates a culture that recognizes and incentivizes innovation [10,34].

In addition, E-HRM assumes a vital role in talent management practices that foster innovation. These systems aid in the identification of employees possessing innovative capabilities and skills. E-HRM tools, including performance management systems, competency frameworks, and career development platforms, can assist in identifying and nurturing high-potential employees who are likely to contribute to sustainable innovation. Additionally, E-HRM can support the recruitment and selection of individuals with innovative mindsets and abilities [23,35].

E-HRM facilitates the management of innovative ideas and feedback loops within organizations. By integrating online platforms for idea generation, evaluation, and implementation into E-HRM, employees can easily submit their ideas, provide feedback on others' ideas, and engage in innovation-driven initiatives. This systematic approach to idea management enables organizations to capture and evaluate innovative ideas effectively, leading to the implementation of sustainable innovation projects [36]. Hence, the following hypothesis is proposed:

Hypothesis 2. *E-HRM positively affects sustainable innovation.*

2.4. *The Relationship between Sustainable Innovation and Sustainable Competitive Advantage*

Sustainable innovation serves as a substantial driver of differentiation for organizations. By introducing innovative and sustainable products, services, or processes, organizations can distinguish themselves in the market and provide distinctive value propositions to customers. This differentiation fosters increased customer loyalty, market share, and pricing power, thereby potentially leading to a sustainable competitive advantage [37,38].

In addition, sustainable innovation empowers organizations to respond to evolving market demands and stakeholder expectations. With sustainability gaining significance among customers, employees, investors, and regulators, organizations that proactively innovate to address environmental and social challenges gain a competitive advantage. By developing sustainable solutions and anticipating emerging trends, organizations can establish themselves as market leaders, attracting environmentally conscious customers and stakeholders [39,40].

Sustainable innovation plays a crucial role in establishing a robust brand reputation and nurturing trust among stakeholders [41]. Organizations that are recognized for their sustainable practices and innovative solutions are more likely to attract and retain customers, talented employees, and socially responsible investors. A positive brand reputation fosters customer loyalty, strengthens stakeholder relationships, and creates a competitive advantage that is challenging for competitors to imitate [42].

Furthermore, sustainable innovation has the potential to unlock fresh markets and business prospects for organizations. With the growing global emphasis on sustainability, organizations that pioneer innovative solutions to tackle environmental and social challenges can access emerging markets, establish new sources of revenue, and extend their market presence. By leading the way in sustainable innovation, organizations can secure a first-mover advantage and establish a robust market position [43,44]. Therefore, the following hypothesis is deduced:

Hypothesis 3. *Sustainable innovation positively affects sustainable competitive advantage.*

2.5. *The Mediating Role of Sustainable Innovation in the Relationship between E-HRM and Sustainable Competitive Advantage*

Implementing E-HRM practices can foster sustainable innovation by establishing a supportive atmosphere for knowledge sharing, collaboration, and employee engagement. Using technology, organizations can enhance communication channels, facilitate cross-functional collaboration, and encourage the exchange of ideas and best practices. This can result in the creation of innovative solutions that address sustainability challenges and opportunities, such as the implementation of eco-friendly HR processes, virtual training programs, or remote work arrangements [45,46].

As previously mentioned, sustainable innovation can provide organizations with a competitive advantage. By implementing innovative and sustainable HR practices, organizations can distinguish themselves in the market by attracting and retaining top talent, improving employee productivity and satisfaction, and aligning HR practices with the organization's sustainability objectives [47].

Indirectly, E-HRM practices that cultivate an environment that is supportive of sustainable innovation can contribute to achieving sustainable competitive advantage. By utilizing technology to facilitate knowledge sharing, collaboration, and employee engagement, E-HRM practices enable the creation and execution of innovative HR practices aligned with sustainability objectives. These sustainable HR practices, in turn, enhance organizational performance, attract top talent, and foster a favorable brand reputation, ultimately resulting in a sustainable competitive advantage [12,48].

E-HRM practices empower organizations to efficiently capture, store, and distribute knowledge throughout the entire organization. By utilizing online platforms, employees can readily access information, exchange best practices, and collaborate on sustainability endeavors. The knowledge management and collaboration facilitated by E-HRM practices

establish a fertile environment for sustainable innovation. Employees can leverage shared knowledge and collaborative efforts to generate innovative ideas and formulate sustainable HR practices that enhance the organization's competitive advantage [30]. Accordingly, the following hypothesis is proposed:

Hypothesis 4. *Sustainable innovation has a mediating effect on the relationship between E-HRM and sustainable competitive advantage.*

2.6. The Relationship between E-HRM and Organizational Agility

Organizational agility pertains to the capacity of an organization to adapt promptly and efficiently to evolving market conditions, customer expectations, and competitive dynamics [49]. E-HRM practices, facilitated by technology, can exert a substantial influence in cultivating organizational agility [7]. E-HRM practices optimize and automate various HR processes, including recruitment, onboarding, performance management, and employee self-service. By digitizing these processes, organizations can eliminate manual administrative tasks, minimize paperwork, and improve the overall efficiency of HR operations. This heightened efficiency enables HR professionals to dedicate more time and resources to strategic endeavors that foster organizational agility, such as talent development and workforce planning [50,51].

E-HRM practices, including online recruitment platforms and talent management systems, contribute to agile talent acquisition. Using technology, organizations can swiftly identify and attract individuals possessing the necessary skills and expertise. E-HRM streamlines the recruitment process, automates candidate screening, and facilitates effective communication with applicants. By expediting the talent acquisition process, organizations can promptly address talent requirements, capitalize on opportunities, and secure a competitive advantage [52,53]. E-HRM facilitates the implementation of agile performance management practices, which are vital for organizational agility. Traditional annual performance reviews are often time-consuming and inflexible, resulting in delayed feedback and limited opportunities for improvement. Through E-HRM practices, organizations can embrace more frequent and adaptable performance feedback mechanisms, such as continuous feedback, real-time goal tracking, and agile performance assessments. This enables faster feedback loops, necessary course corrections, and the alignment of individual and team goals with evolving business objectives. Agile performance management practices, supported by E-HRM, contribute to heightened employee engagement, accelerated skill development, and enhanced organizational agility [17,54]. Accordingly, the following hypothesis is proposed:

Hypothesis 5. *E-HRM positively affects organizational agility.*

2.7. The Relationship between Organizational Agility and Sustainable Competitive Advantage

Organizations with organizational agility can swiftly adjust to market fluctuations, including shifts in customer preferences, emerging technologies, regulatory modifications, and competitive dynamics [55]. Such agile organizations can promptly detect and react to these changes, enabling them to capitalize on new opportunities and mitigate potential risks. By effectively responding to market fluctuations, organizations can sustain a competitive advantage over their competitors and position themselves favorably in the market [18].

Within organizations, agility cultivates a culture of innovation and ongoing enhancement [56]. Agile organizations actively promote experimentation, embrace change, and empower employees to contribute ideas and perspectives. This emphasis on innovation allows organizations to create novel products, services, and processes that align with evolving customer demands, enhance operational efficiency, and elevate overall performance. Through continuous innovation and improvement, organizations can establish a distinct identity from their competitors and forge a sustainable competitive advantage [57]. Talent management and organizational resilience are intricately linked to organizational

agility. Agile organizations effectively draw and retain exceptional talent by providing a dynamic work environment, growth prospects, and a strong emphasis on learning and development. Additionally, they foster a resilient culture capable of adapting to uncertainty, rebounding from setbacks, and deriving lessons from failures. Possessing a skilled and resilient workforce grants organizations a competitive advantage by equipping them to navigate challenges, respond to disruptions, and maintain a sustained high performance over time [18,58].

Agile organizations demonstrate exceptional proficiency in swiftly introducing new products and services. They possess streamlined processes, flexible decision making frameworks, and effective communication channels that enable rapid product development and deployment. This agility in terms of reaching the market expeditiously empowers organizations to capitalize on emerging trends and meet customer demands, thereby securing a first-mover advantage and establishing a robust market position. The ability to promptly deliver value to customers contributes to a sustainable competitive advantage by establishing barriers to entry and fostering customer loyalty [57]. Hence, the following hypothesis is postulated:

Hypothesis 6. *Organizational agility positively affects sustainable competitive advantage.*

2.8. The Mediating Role of Organizational Agility in the Relationship between E-HRM and Sustainable Competitive Advantage

Organizational agility encompasses various dimensions, including strategic agility (the capacity to adapt to evolving strategies and business models), operational agility (to respond to operational changes swiftly), and learning agility (an ability to acquire and apply new knowledge and skills). In dynamic and competitive markets, organizational agility is crucial for organizations to flourish [55,59]. The implementation of E-HRM practices can have a substantial impact on the speed and responsiveness of HR processes, thereby enhancing the overall agility of the organization. Through the reduction of administrative burdens, facilitation of faster decision making, and promotion of rapid information flow, E-HRM practices play a vital role in fostering organizational agility. This agility enables organizations to adapt to market changes swiftly, meet customer demands, and address competitive pressures [17,60].

E-HRM practices equip organizations with the flexibility and adaptability to address evolving HR needs and business requirements. For instance, online self-service platforms empower employees to independently manage their HR tasks, minimizing administrative bottlenecks and enabling a more flexible resource allocation. E-HRM systems also facilitate the collection and analysis of HR data, enabling evidence-based decision making and supporting agile workforce planning. By promoting flexibility and adaptability, E-HRM practices enhance organizational agility, thereby contributing to the development of a sustainable competitive advantage [31,61]. E-HRM practices foster a culture of learning and innovation within organizations. Through online learning platforms, knowledge sharing tools, and collaborative platforms, employees are empowered to engage in continuous learning, exchange knowledge, and drive innovation. By cultivating a learning mindset and offering opportunities for skill development and innovation, E-HRM practices enhance the organization's capacity for learning agility and innovation. This, in turn, contributes to the organizational agility, enabling the organization to swiftly adapt to changing market dynamics and secure a sustainable competitive advantage [31,62]. Therefore, the following hypothesis is formulated:

Hypothesis 7. *Organizational agility has a mediating effect on the correlation between E-HRM and sustainable competitive advantage.*

The hypothesized research framework is presented in Figure 1 below.

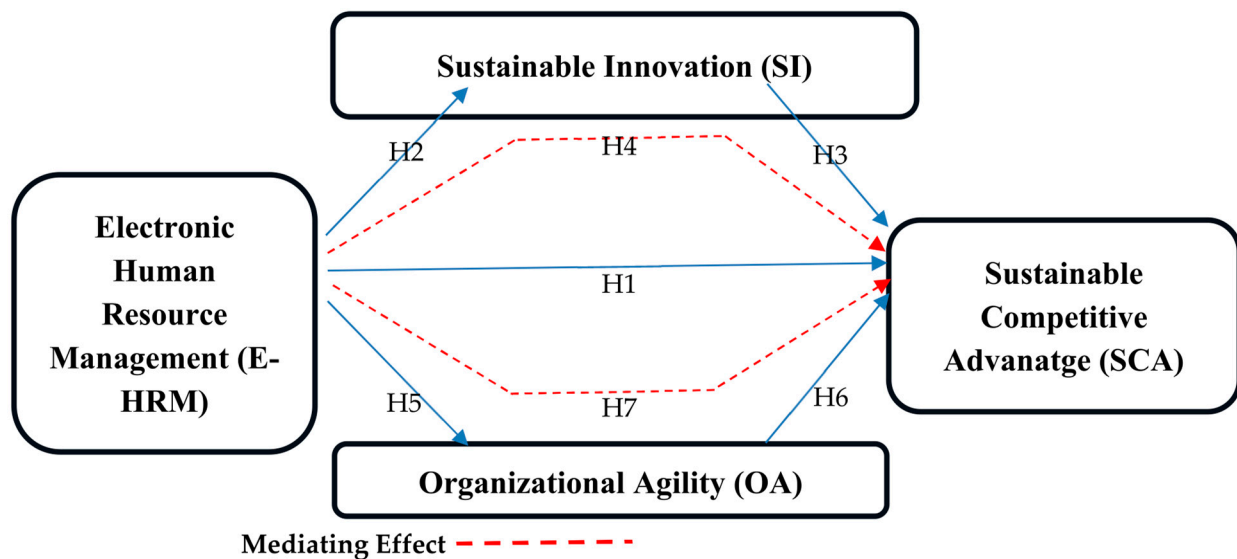


Figure 1. The hypothesized research framework.

3. Methodology

3.1. Questionnaire Design and Study Measures

Quantitative research using a structured survey was utilized to collect the required data. A survey was used to evaluate the electronic human resource management system in the tourism and hospitality businesses (travel agencies in category A and five-star hotels) and its impact on achieving a sustainable competitive advantage, sustainable innovation, and organizational agility. The survey is divided into two parts. Employee profiles, including gender, age, education level, job experience, and workplace type, were addressed in the first part. The four investigated concepts were examined in the second part. All items were evaluated using a five-point Likert scale.

The E-HRM system was evaluated by a 6-item scale adapted from Nyathi and Kekwaletswe [63]. For instance, we incorporated statements such as “I have the necessary knowledge to use the e-HRM system” and “The e-HRM system helps me improve my job performance”. In addition, sustainable competitive advantage was assessed by a 4-item scale created by Hossain et al. [64]. For example, the scale included statements such as “This hotel/travel agency offers comparatively lower prices than competitors” and “This hotel/travel agency responds well to customer demand for new features”. Moreover, sustainable innovation was assessed by a 6-item scale adapted from Delmas and Pekovic, S. [65]. For example, this included statements such as “We have introduced products, processes, organizational, or marketing innovations that reduce resources and materials per unit of production” and “We have introduced products, processes, organizational, or marketing innovations that replace materials with less polluting or hazardous substitutes”. Furthermore, organizational Agility was measured by a 4-item scale developed by Melián-Alzola et al. [66]. Sample items include “The hotel/travel agency is an agile organization capable of adapting to changes” and “The hotel/travel agency can respond quickly to changes”. Appendix A presents the detailed measurement scales.

A panel of specialists, specifically human resource managers from hotels and travel agencies, reviewed the survey. The panel reached an agreement on the validity of all scales employed in the study. In addition, this study took the recommendation of Donaldson et al. [67] and asked participants after the survey whether they felt frightened that their answers might jeopardize their work, to establish if answers were to be omitted subsequently, in order to prevent socially acceptable replies that may arise from self-reporting.

3.2. Sample and Data Collection Procedures

The present research population includes all middle and first-line managers from tourism and hospitality firms (category A travel agencies and five-star hotels) in Egypt. These two categories of businesses were chosen because they dominate Egypt's hospitality and tourism sector. They also share characteristics, such as dealing with foreign visitors and striving to provide high-quality services; thus, they are eager to embrace a variety of EHRM systems to improve their operations and achieve a competitive advantage while keeping the global need for sustainability in mind. According to the Egyptian Ministry of Tourism, there were 158 5-star hotels and 2222 category (A) travel agencies in Egypt in 2018. The convenience sample approach was adopted for the current study because it is widely used when randomization is impractical due to a large population and limited resources. A total of 500 questionnaires were sent to the firms under investigation in the Greater Cairo Region of Egypt after making phone calls with human resources departments to request approval to visit and disseminate the questionnaire on their property. Only 313 valid forms were obtained, with a response rate of 62.6%; of those polled, 213 (68.1%) respondents worked at 26 five-star hotels, while 100 (31.9%) worked in 50 travel agencies. Hair et al. [68] state that estimating the proper sample size should be based on the number of variables being studied; the least acceptable ratio is "variable: sample = 1:10". The minimum sample size necessary for this study was 200 participants due to the twenty items under investigation. The final analysis was therefore adequate, with a sample size of 313 middle and first-line managers.

3.3. Data Analysis

To assess the measurement and structural model, as well as to test the research hypotheses, the current study used the PLS-SEM approach with WarpPLS software 7.0 [69]. PLS-SEM is a widely used analytical technique in various situations, including tourism research [70]. It is an appropriate tool for evaluating complex structural models that connect several variables via both indirect and direct pathways [71], as demonstrated in this study model. A multi-group analysis (MGA) was also performed to see if there were any notable variations in employees' replies due to variations in their workplaces. The multi-group analysis allows researchers to see if there are any significant variations in group-specific parameter estimations (e.g., outer weights, outer loadings, and path coefficients) between pre-defined data groups.

4. Results

4.1. Participant Profiles

Out of the 313 participants, there were 265 (84.7%) men and 48 (15.3%) women. A total of 152 respondents (48.6%) were between the ages of 35 and 45, while 121 (38.7%) were under the age of 30. Furthermore, the majority (n = 253, 80.8%) had a bachelor's degree. In addition, 60 participants (19.2%) had work experience of fewer than two years, 61 (19.5%) between two and five years, 51 (16.3%) between six and ten years, and 141 participants (45%) had work experience of ten years or more. Moreover, 213 participants (68.1%) worked in five-star hotels, while 100 (31.9%) worked in travel agencies (Table 1).

4.2. Reliability and Validity

Confirmatory factor analysis (CFA) was carried out (see Table 2). The computed item loadings varied between 0.613 and 0.857. Factor loading values greater than 0.5 were deemed acceptable, in line with Hair et al. [68]. Table 2 further shows that Cronbach's alpha and composite reliability values are more than 0.7 for all variables, indicating a good reliability. Likewise, because the AVE values are greater than 0.5, the scale's validity has been proved using the Hair et al. [68] criterion. Additionally, variance inflation factors (VIFs) are computed for each latent variable in a model, indicating that it is free of common method bias since the VIF values are ≤ 3.3 [72].

Table 1. Participant profiles (N = 313).

		Frequency	Percent
Gender	Male	265	84.7
	Female	48	15.3
Age	<35 years	121	38.7
	35: <45 years	152	48.6
	≥45	40	12.8
Education	High school/institute	50	16.0
	Bachelor	253	80.8
	Master's/PhD	10	3.2
Experience	<2 years	60	19.2
	2: 5 years	61	19.5
	6: <10 years	51	16.3
	≥10 years	141	45.0
Work organization	Hotels	213	68.1
	Travel agency	100	31.9

Table 2. Factor loadings, Cronbach's, CR, AVE, and VIF.

	Item Loading	p Value **	VIF	CR	CA	AVE	Full Collinearity VIF
Electronic human resource management (E-HRM)	-	-	-				
E-HRM.1	0.712	<0.001	1.652				
E-HRM.2	0.772	<0.001	1.853				
E-HRM.3	0.808	<0.001	2.191	0.898	0.863	0.595	3.137
E-HRM.4	0.767	<0.001	1.939				
E-HRM.5	0.813	<0.001	2.856				
E-HRM.6	0.752	<0.001	2.491				
Sustainable competitive advantage (SCA)							
SCA.1	0.872	<0.001	2.274				
SCA.2	0.850	<0.001	2.120	0.866	0.791	0.622	3.178
SCA.3	0.794	<0.001	1.628				
SCA.4	0.613	<0.001	1.219				
Sustainable innovation (SI)							
SI.1	0.802	<0.001	2.017				
SI.2	0.833	<0.001	2.444				
SI.3	0.809	<0.001	2.661	0.915	0.889	0.643	1.998
SI.4	0.826	<0.001	2.610				
SI.5	0.792	<0.001	3.101				
SI.6	0.746	<0.001	2.896				
Organizational agility (OA)							
OA.1	0.846	<0.001	2.797				
OA.2	0.857	<0.001	2.881	0.903	0.856	0.699	2.383
OA.3	0.836	<0.001	2.298				
OA.4	0.803	<0.001	2.119				

CR: composite reliability; CA: Cronbach's alpha; AVE: average variance extracted; VIF: variance inflation factors; ** p value for item loading.

Moreover, Franke and Sarstedt [73] stated that “the correlation between two latent variables must be significantly less than unity to prove discriminant validity, and the AVE value for each variable must be greater than the greatest common value”. The discriminant validity of the study model has therefore been accomplished according to the data reported in Table 3. The discriminant validity demonstrates that two tests that should not be connected are, in fact, unrelated.

Table 3. Discriminant validity results.

	SCA	E-HRM	SI	OA
Sustainable competitive advantage (SCA)	0.789	0.721	0.679	0.707
Electronic human resource management (E-HRM)	0.774	0.774	0.649	0.726
Sustainable innovation (SI)	0.679	0.649	0.802	0.546
Organizational agility (OA)	0.707	0.726	0.546	0.836

The HTMT for the validity was also calculated (see Table 4), and all values were less than 0.90, indicating that the results to confirm validity are satisfactory. The HTMT criteria calculate the average correlations between constructs.

Table 4. HTMT for validity.

HTMT Ratios (Good if <0.90, Best if <0.85)	SCA	E-HRM	SI	OA
Sustainable competitive advantage (SCA)				
Electronic human resource management (E-HRM)	0.864			
Sustainable innovation (SI)	0.828	0.741		
Organizational agility (OA)	0.869	0.846	0.622	
<i>p</i> values (one-tailed) for HTMT ratios	SCA	E-HRM	SI	OA
Sustainable competitive advantage (SCA)				
Electronic human resource management (E-HRM)	0.025			
Sustainable innovation (SI)	<0.001	<0.001		
Organizational agility (OA)	0.009	0.003	<0.001	

4.3. Model Fit and Quality Indices

The current study met all of the requirements set out by Kock [69] for model fit and quality index (see Appendix B).

4.4. Results of Testing the Study Hypotheses

The hypothesis testing results (see Figure 2) revealed that there is a positive effect of electronic human resource management (E-HRM) on sustainable competitive advantage (SCA) ($\beta = 0.34$, $t = 6.295$, $p < 0.01$), sustainable innovation (SI) ($\beta = 0.71$, $t = 14.044$, $p < 0.01$), and organizational agility (OA) ($\beta = 0.79$, $t = 15.817$, $p < 0.01$). This implies that SI, OA, and SCA are prone to being high when the use of E-HRM rises. Therefore, H1, H2, and H5 are supported. Additionally, either SI or OA has a positive effect on SCA ($\beta = 0.30$, $t = 5.476$, $p < 0.01$ and $\beta = 0.29$, $t = 5.401$, $p < 0.01$), respectively. This means that when SI and OA are higher, SCA tends to be high. Therefore, H3 and H6 are supported.

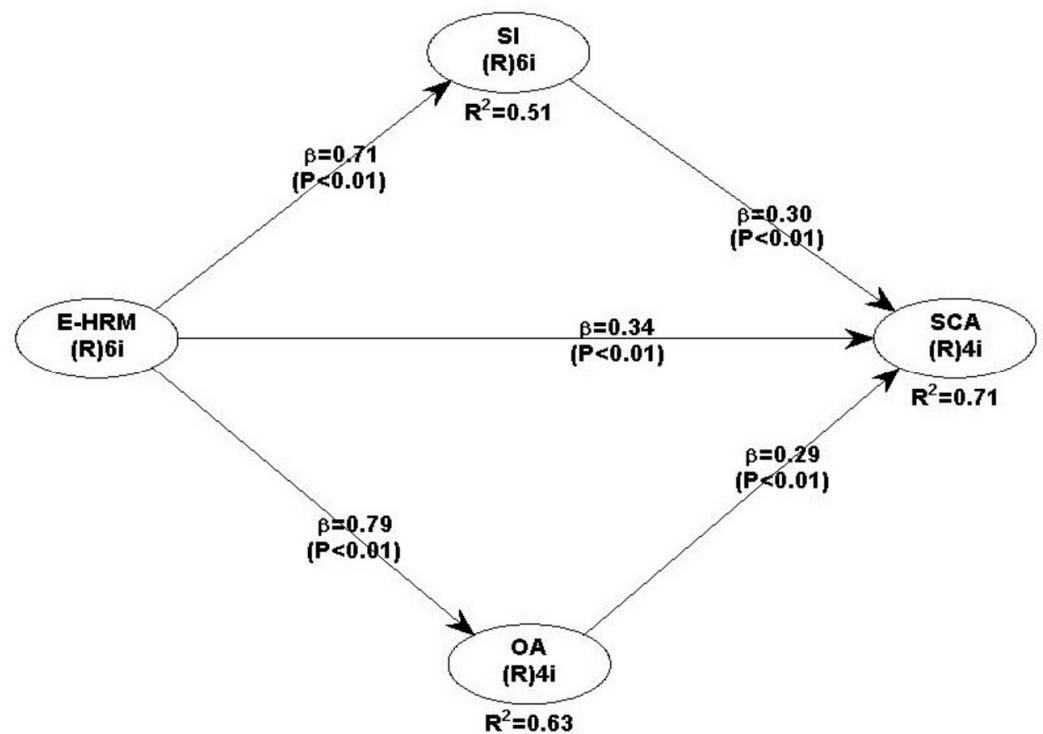


Figure 2. Final model of the study.

Furthermore, Figure 2 shows that E-HRM interpreted 51% of the variance in SI ($R^2 = 0.51$) and 63% of the variance in OA ($R^2 = 0.63$). Moreover, E-HRM, SI, and OA interpreted 71% of the variance in SCA ($R^2 = 0.71$).

Lastly, according to Table 5, to examine the EHRM→SI→SCA and EHRM→OA→SCA mechanisms, a “Bootstrapped Confidence Interval” was computed (see Table 5). For the SI mediating effect, the indirect effect’s Std. $\beta = 0.213$ (0.710×0.300) was significant (p -value < 0.05) and had a t -value of 5.605. Furthermore, the “95% Bootstrapped Confidence Interval” (LL = 0.139, UL = 0.287) does not straddle a zero in-between, proving mediation. Thus, statistically significant evidence existed for the mediating effect of SI in the EHRM→SCA relationship. Therefore, H4 is supported.

Table 5. Mediation analysis’ Bootstrapped Confidence Interval.

Hypothesis 4	Path a GTL→GOGB	Path b GOGB-GIB	Indirect Effect	SE	t-Value	95% LL	95% UL	Decision
EHRM→SI→SCA	0.710	0.300	0.213	0.038	5.605	0.139	0.287	Mediation
Hypothesis 7	Path a GTL→GWE	Path b GWE-GIB	Indirect Effect	SE	t-Value	95% LL	95% UL	Decision
EHRM→OA→SCA	0.790	0.290	0.229	0.038	6.029	0.155	0.304	Mediation

For the OA mediating effect, the indirect effect’s Std. $\beta = 0.229$ (0.790×0.290) was significant (p -value < 0.05) and had a t -value of 6.029. Furthermore, the “95% Bootstrapped Confidence Interval” (LL = 0.155, UL = 0.304) does not straddle a zero in-between, proving mediation. Thus, statistically significant evidence existed for the mediation effect of OA in the EHRM→SCA relationship. Therefore, H7 is supported.

4.5. Multi-Group Analysis (MGA)

Multi-group analysis (MGA) was performed to determine whether there were substantial variations in participants' answers due to changes in their work enterprises. There are no significant differences in any path coefficients between personnel of five-star hotels and those of travel agencies according to the test findings in Table 6.

Table 6. Multi-group analysis.

Group Pair Results (Five-Star Hotel = 1; Travel Agency = 2)						
Path Coefficients	Path Coeff. (Five-Star Hotel)	Path Coef. (Travel Agency)	Absolute Path coeff. Diff.	<i>p</i> -Values	Tstatistic	Significant/No Significant
EHRM→SCA	0.289	0.488	0.199	0.075	1.780	No Significant
EHRM→SI	0.719	0.703	0.016	0.877	0.154	No Significant
EHRM→OA	0.762	0.855	0.093	0.364	0.907	No Significant
SI→SCA	0.289	0.344	0.055	0.628	0.485	No Significant
OA→SCA	0.335	0.127	0.209	0.068	1.822	No Significant

5. Discussion

This study aims to explore how electronic human resource management (E-HRM) affects achieving a sustainable competitive advantage (SCA), taking into consideration the roles of sustainable innovation (SI) and organizational agility (OA) as mediators. The main aim of the study is threefold.

First, the study simultaneously investigates how E-HRM impacts SCA, SI, and OA. The findings are consistent with those of other studies [30,31,54,74–76] that emphasized the importance of E-HRM in corporate sustainability management. The study by Shamout et al. [12] suggested that E-HRM practices have a considerable impact on SCA. E-HRM was established to attain high commitment, competencies, cost efficiency, and a higher alignment for an organization toward sustainability [74,75,77]. E-HRM also allows for the efficient storing, retrieval, and exchange of HR knowledge and information. It offers easy access to critical information by providing centralized databases for employee profiles, training materials, rules, and procedures. Effective knowledge management promotes organizational learning, innovation, and decision making, resulting in a sustainable competitive advantage [8,30].

Moreover, by incorporating E-HRM into strategic decision making processes, organizations may develop a workforce that is aligned with their strategic goals, producing a long-term competitive advantage [12,31].

Accordingly, E-HRM has the potential to facilitate ongoing learning and development initiatives that enhance employees' innovative capabilities. Through e-learning platforms, virtual training programs, and knowledge sharing modules integrated within E-HRM, employees can acquire new skills, stay informed about emerging trends, and cultivate a mindset that embraces innovation. By prioritizing and investing in the learning and development of employees, organizations can cultivate a workforce that is equipped to drive sustainable innovation [54,78]. Furthermore, organizations may adopt more frequent and flexible performance feedback mechanisms through E-HRM practices, such as continuous feedback, real-time goal monitoring, and agile performance evaluations. This makes it possible to close feedback loops more quickly, make required course adjustments, and match team and individual goals with dynamic corporate goals. Agile performance management practices, when supported by E-HRM, increase employee engagement, expedite skill development, and improve organizational agility [17,54].

By executing sustainable innovation practices, organizations may successfully collect and analyze new ideas thanks to this systematic approach to idea management [36].

Second, the study simultaneously investigates SI's and OA's impacts on SCA. The findings are consistent with those of past studies that emphasized the role of SI and OA in SCA in an organization. Sustainable innovation has the potential to generate cost savings, which are crucial factors in achieving a sustainable competitive advantage. Innovations that enhance resource utilization, minimize waste, or improve operational efficiency can contribute to reduced production costs. Through the adoption of sustainable practices, organizations can minimize their environmental impact, optimize resource consumption, and streamline operations, thereby realizing cost savings [79,80] and, hence, enhancing the organization's sustainable competitive advantage. In addition, agile businesses actively encourage experimentation, welcome change, and provide staff members with the freedom to share their opinions. This emphasis on innovation enables organizations to develop new goods, services, and processes to meet changing client expectations, improve operational efficiency, and improve overall performance. Organizations may differentiate themselves from competitors and create a long-lasting competitive advantage by continuously innovating and improving [57].

Third, two types of mediation were tested in the current study: the E-HRM→SI→SCA and E-HRM→OA→SCA continuums. This allows the study to identify the indirect impact of E-HRM on SCA. The results, specifically the indirect pathways, make it possible to examine the relationships between the four constructs more in depth than what was previously possible. The use of e-HRM allows for specific strategic initiatives to respond to organizations' social, financial, economic, technical, and ecological needs [59]. E-HRM systems signify preserving the environment and its contents for future use [81]. E-HRM includes online recruitment, training, and development activities that help employees establish organizational values [82] concerning sustainability. E-HRM enables organizations to integrate electronic job designs and can assist organizations in motivating employees towards value-based decisions [83], such as sustainability practices. If an organization can retain people through enhanced talent management using e-HRM practices [84], it can have high returns on investments [85].

E-HRM systems may build technologically improved human resource practices, which boost the company's reputation and goodwill in the market [83] and, hence, SCA. Creating an atmosphere that is conducive to sustainable innovation and agility through E-HRM practices can indirectly help businesses attain a sustained competitive advantage. E-HRM practices enable the formulation and implementation of new HR practices that are linked with sustainability objectives by utilizing technology to improve information exchange, collaboration, and employee involvement. These E-HRM practices, in turn, enhance organizational performance, attract top people, and build a positive brand reputation, resulting in a sustainable competitive advantage [12,48].

6. Conclusions

The purpose of this study was to investigate how electronic human resource management (E-HRM) systems influence the development of a sustainable competitive advantage (SCA). It also looked at the roles of sustainable innovation (SI) and organizational agility (OA) as mediators. The middle and first-line management of five-star hotels and travel agencies in category A operating in Egypt were investigated. Using the PLS-SEM approach, the findings revealed that E-HRM is positively associated with SCA, SI, and OA. Furthermore, there were positive associations between SI and OA and SCA. SI and OA were also shown to be mediators in the relationship between E-HRM and SCA. The study adds to the existing literature on how E-HRM impacts SI, OA, and SCA.

7. Theoretical Implications

The Dynamic Capabilities Theory offers a conceptual framework for comprehending how organizations can cultivate and adjust their capabilities to maintain a competitive advantage. This research study contributes to the theory by presenting empirical evidence on how E-HRM practices impact sustainable competitive advantage, mediated by the roles

of sustainable innovation and organizational agility. The Dynamic Capabilities Theory provides a versatile framework that is applicable to various industries and organizational settings. This study emphasizes the distinctive capabilities and mechanisms through which E-HRM practices, such as digital recruitment, online training, and performance management systems, foster sustainable innovation and organizational agility, ultimately achieving a sustainable competitive advantage. Furthermore, it examines and investigates the mediating functions of sustainable innovation and organizational agility in the link between E-HRM and sustainable competitive advantage. By delving into these mediating mechanisms, the study enhances our comprehension of how E-HRM practices impact organizational outcomes. It offers a more comprehensive understanding of how E-HRM practices contribute to a sustainable competitive advantage by fostering sustainable innovation and bolstering organizational agility, both of which are integral elements of an organization's dynamic capabilities.

8. Practical Implications

This study, examining the impact of E-HRM on achieving a sustainable competitive advantage and explicitly considering the mediating functions of sustainable innovation and organizational agility, holds several practical implications for organizations in the tourism and hospitality industry. The study underscores the importance of harnessing digital technologies in HR processes. To thrive in this sector, tourism and hospitality organizations should embrace digital transformation by adopting E-HRM practices like digital recruitment, online training, and performance management systems. By doing so, organizations can enhance the efficiency, effectiveness, and decision making within their HR functions, resulting in improved overall organizational performance and a sustainable competitive advantage. This study highlights the importance of sustainable innovation as a mediator between E-HRM and a sustainable competitive advantage. In the context of tourism and hospitality organizations, these entities must cultivate a sustainable innovation culture. This can be achieved by integrating sustainability principles into HR practices, fostering idea generation, and promoting employee collaboration. By adopting such approaches, organizations can create and implement HR practices and products that are environmentally, socially, and economically sustainable, thus setting themselves apart from competitors in the industry.

Importantly, organizational agility acts as a mediator between E-HRM and achieving a sustainable competitive advantage. In the context of tourism and hospitality organizations, these entities must prioritize enhancing their skill. This can be achieved by implementing flexible HR processes, facilitating real-time data access, and fostering streamlined communication and collaboration. By doing so, organizations can swiftly and efficiently respond to shifting market dynamics, capitalize on emerging opportunities, and adapt their HR strategies to align with evolving business requirements. Similarly, the study underscores the significance of aligning HR strategies with dynamic capabilities to attain a sustainable competitive advantage. Organizations must ensure that their HR practices align with their strategic goals and objectives, enabling HR processes and procedures to foster the development and renewal of capabilities. This entails incorporating E-HRM practices that promote agility, sustainable innovation, and the ability to respond to environmental changes effectively.

Significantly, in the context of E-HRM, there is a need for investing the development of employee skills and competencies. This involves offering training and development opportunities that improve digital literacy, technological proficiency, and adaptability to digital HR tools and platforms. By equipping employees with the essential skills, organizations can maximize the advantages of E-HRM practices and strengthen their dynamic capabilities. Finally, it is necessary for organizations to consistently monitor and assess the effects of E-HRM practices on achieving a sustainable competitive advantage, sustainable innovation, and organizational agility. By measuring key performance indicators and soliciting employee feedback, organizations can identify areas that require improvement,

make informed adjustments to their HR strategies, and maintain the alignment of E-HRM practices with dynamic capabilities.

9. Limitations and Future Research

Although this study investigates the impact of E-HRM on developing a sustainable competitive advantage, with a focus on sustainable innovation and organizational agility in the tourism and hospitality industry, it is essential to acknowledge its limitations and identify potential directions for future research. The study proposed sustainable innovation and organizational agility as mediating variables; however, it is worth considering the existence of additional mechanisms. Future research in the tourism and hospitality industry could explore alternative mediating variables such as organizational health, flexibility, and leadership style to gain a more comprehensive understanding of the relationship between E-HRM and fostering a sustainable competitive advantage.

In addition, the study did not consider all external factors and contingencies that may influence the relationships being examined. Future research could explore the moderating effects of contextual factors, such as organizational culture, industry dynamics, and regulatory environments, to obtain a more comprehensive understanding of the connections between E-HRM, sustainable innovation, organizational agility, and sustainable competitive advantage. Meanwhile, in future research, adopting a mixed-methods approach could offer a more comprehensive understanding of the examined relationships. By integrating qualitative and quantitative data, researchers can obtain more profound insights into how E-HRM impacts sustainable innovation, organizational agility, and sustainable competitive advantage. Qualitative methods such as interviews or case studies can capture contextual information and assist in identifying specific factors that contribute to or impede the relationships being studied.

The study primarily concentrated on the organizational level and has yet to consider the influence of individual or team-level factors. In future research, employing a multi-level analysis could explore how personal and team-level variables, such as employee competencies, team dynamics, and leadership styles, interact with E-HRM practices, sustainable innovation, organizational agility, and sustainable competitive advantage. This approach would contribute to a more comprehensive understanding of the underlying mechanisms across various levels of analysis.

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Appendix A

Sustainable Competitive Advantage (SCA) Hossain et al. (2021) [64]
SCA.1. This hotel/travel agency offers comparatively lower prices than competitors
SCA.2. This hotel/travel agency offers high-quality product/service to the customer
SCA.3. This hotel/travel agency responds well to customer demand for new features
SCA.4. This hotel/travel agency has a time-to-market lower than the industry average.
Organizational Agility (OA) Melián-Alzola et al. (2020) [66]
OA.1. The hotel/travel agency is an agile organization capable of adapting to changes.
OA.2. The hotel/travel agency can predict and identify changes.
OA.3. The hotel/travel agency can respond quickly to changes.
OA.4. The hotel/travel agency can respond flexibly to new demands for services that arise, adapting them to the resources and means available.
Sustainable innovation (SI) Delmas and Pekovic, S. (2018). [65]
SI.1. We have introduced products, processes, and organizational, or marketing innovations that reduce resources and materials per unit of production.
SI.2. We have introduced products, processes, and organizational, or marketing innovations that reduce energy use.
SI.3. We have introduced products, processes, and organizational, or marketing innovations that reduce carbon dioxide production.
SI.4. We have introduced products, processes, and organizational, or marketing innovations that replace materials with less polluting or hazardous substitutes.
SI.5. We have introduced products, processes, organizational, or marketing innovations that reduce soil, water, noise, or air pollution.
SI.6. We have introduced products, processes, organizational, or marketing innovations to recycle waste, water, or materials.
E-HRM Nyathi and Kekwaletswe (2022). [63]
E-HRM.1. I have the necessary knowledge to use the e-HRM system
E-HRM.2. Use of e-HRM applications does not require a lot of mental effort
E-HRM.3. The e-HRM system is clear and understandable
E-HRM.4. The e-HRM system helps me improve my job performance
E-HRM.5. I find the e-HRM system useful for performing my day-to-day job-related activities at lower costs
E-HRM.6. E-HRM allows employees to perform job-related activities faster

Appendix B Model Fit and Quality Indices

	Assessment	Criterion	Supported/Rejected
Average path coefficient (APC)	0.486, $p < 0.001$	$p < 0.05$	Supported
Average R-squared (ARS)	0.614, $p < 0.001$	$p < 0.05$	Supported
Average adjusted R-squared (AARS)	0.612, $p < 0.001$	$p < 0.05$	Supported
Average block VIF (AVIF)	2.804	acceptable if ≤ 5 , ideally ≤ 3.3	Supported
Average full collinearity VIF (AFVIF)	2.674	acceptable if ≤ 5 , ideally ≤ 3.3	Supported
Tenenhaus GoF (GoF)	0.627	small ≥ 0.1 , medium ≥ 0.25 , large ≥ 0.36	Supported
Sympson’s paradox ratio (SPR)	1.000	acceptable if ≥ 0.7 , ideally = 1	Supported
R-squared contribution ratio (RSCR)	1.000	acceptable if ≥ 0.9 , ideally = 1	Supported
Statistical suppression ratio (SSR)	1.000	acceptable if ≥ 0.7	Supported
Nonlinear bivariate causality direction ratio (NLBCDR)	1.000	acceptable if ≥ 0.7	Supported

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