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Article

The Role of Cybersecurity in Responding to the Requirements of Digital Tourism: An Application to Tourism Companies in the City of Mosul

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Abstract: The sector of digital tourism represents the latest in tourism activities, though it involves some challenges, especially threats associated with cybersecurity risks. This study aims to understand the concept of digital tourism, its significance, and characteristics, and to identify the requirements for enabling digital tourism. It also seeks to clarify the concept of cybersecurity, its objectives, and its types, as well as explore the relationship between cybersecurity measures and the activation of digital tourism. The study employed a descriptive-analytical approach to analyze the study variables and a survey method by distributing a questionnaire to a random sample of 130 individuals working in tourism companies in Mosul. The findings indicate a strong correlation between technological, economic, human, and legal cybersecurity measures and the requirements for activating digital tourism. The study recommends training employees on handling cybersecurity threats and coordinating with the Ministry of Tourism to issue a certification for cybersecurity standards compliance for tourism companies.

Keywords: Digital Tourism, Cybersecurity, Tourism Companies, Cybersecurity Measures, Mosul

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1. Introduction

Various fields within the tourism sector are experiencing a technological revolution toward the digital transformation of tourism activities. Information technology has become a core element in supporting the digital tourism industry, providing significant advantages in the production and distribution of tourism services and enhancing digital tourism marketing mechanisms (Attia et al., 2008, p. 1). Digital technologies have been the primary driver in transforming the tourism value chain, responding to market demands, and addressing the increasing need for digital skills and technological jobs in the tourism sector (World Tourism Organization, 2018, p. 1).

Digital tourism is a modern concept in the tourism industry, with its emergence linked to the early days of the Internet and the launch of degriftour.com as the first online tourism site in 1990 (Qasuri, 2021, p. 56). Today, digital tourism holds a leading position in e-commerce, gaining increasing importance in the internet age, which has become the backbone and primary foundation of modern tourism, and is key to its future growth and prosperity (Nedelea & Balan, 2010, p. 503). This was evident in the "Tourism and Digital Transformation" theme promoted by the World Tourism Organization on World Tourism Day, September 27, 2018 (Oroan, 2019, p. 173). The online travel market was valued at around $474.9 billion in 2022, with projections to reach nearly $1 trillion by 2030 (Adly, 2023, p. 5).

The success of tourism companies in implementing digital tourism relies on effectively managing and monitoring information technology in a way that ensures

organizational goals are met. This is closely tied to the concept of cybersecurity, which has recently gained importance due to the growing risks and threats associated with internet and network usage (Al-Tahat, 2023, p. 10). It is aimed at accessing, broadcasting, manipulating, exploiting, or trading information (Abdel Fattah, 2021, p. 275). The need for essential measures to achieve cybersecurity in the tourism and hospitality industry has become urgent, ensuring information confidentiality, integrity, and availability during storage, processing, and transmission using electronic means (Luiijf et al., 2013, p. 4).

In this context, the research discusses the role of cybersecurity in meeting the requirements of digital tourism, with a focus on tourism companies in Mosul.

2. Materials and Methods

First: The Methodological Framework

1 - Research Problem:

The repercussions of the COVID-19 pandemic had a profound impact on the global tourism and travel industry, creating an urgent need to activate digital tourism. The Arab Tourism Organization called for the digital transformation of tourism and travel services, following a significant surge in digital technology within e-commerce, digital applications, and electronic entertainment during the pandemic (Mohammad and Ghanem, 2022, p. 473) (Al-Johary, 2021, p. 278). However, digital tourism activities involve numerous challenges related to protecting tourism companies' information and safeguarding customer data, a matter closely tied to the concept of cybersecurity. Iraq is one of the countries facing weaknesses in protecting cyberspace, lacking adequate capacity to address these challenges due to weak technological, financial, and human infrastructure, and an absence of the necessary knowledge, management, and legal efforts required to achieve cybersecurity (Khreisan, 2021, p. 8). The research problem centers on the following question: What is the role of cybersecurity in meeting the requirements of digital tourism in tourism companies in Mosul, Iraq?

2 - Research Hypotheses:

- **2/1** There is a statistically significant correlation between technological cybersecurity measures and meeting digital tourism requirements in tourism companies in Mosul.
- **2/2** There is a statistically significant correlation between economic cybersecurity measures and meeting digital tourism requirements in tourism companies in Mosul.
- **2/3** There is a statistically significant correlation between human cybersecurity measures and meeting digital tourism requirements in tourism companies in Mosul.
- **2/4** There is a statistically significant correlation between legal cybersecurity measures and meeting digital tourism requirements in tourism companies in Mosul.

3 - Research Objectives:

- 3/1 Understanding the concept, importance, and characteristics of digital tourism.
- 3/2 Identifying the requirements for enabling digital tourism.
- 3/3 Clarifying the concept, objectives, and types of cybersecurity.
- 3/4 Examining the relationship between cybersecurity measures and the activation of digital tourism.

4 - Research Importance:

The significance of this research lies in both academic and practical fields. Academically, it addresses the critical topic of digital transformation in the tourism industry, which impacts the performance of tourism companies, market competitiveness, customer needs fulfillment, and their ability to handle current technological challenges related to digital tourism applications and cybersecurity risks. Practically, the study provides tourism companies with a fresh perspective that may help them protect organizational information and customer data by implementing cybersecurity measures

to meet digital tourism requirements. This could lead to keeping pace with digital changes, increasing customer trust, and expanding market share.

5 - Research Methodology:

The study adopted a descriptive-analytical approach for interpreting study variables, alongside a survey method through a questionnaire distributed to a random sample of employees at tourism companies in Mosul to collect data and test the hypotheses.

6 – Research Limits:

– 6/1 Spatial: The research applies to tourism companies in Mosul, Iraq.

– 6/2 Temporal: The questionnaire was distributed from April 1, 2024, to July 30, 2024, through Google Forms.

– 6/3 Human: A random sample of 130 employees from tourism companies in Mosul was surveyed.

Literature Review

Second: The Theoretical Aspect

1 – Digital Tourism

1/1 Definition of Digital Tourism:

Digital tourism refers to information and communication technology-based services that rely on e-commerce principles to deliver and promote tourism services among all stakeholders and partners in the tourism sector (Kawash & Qumrawi, 2013, p. 34). It involves providing a digital tourism experience to the tourist before, during, and after the activity, assisting in finding suitable accommodations, reaching tourist destinations, and planning travel programs from home (Benyon et al., 2013, p. 1). It also includes adopting technology to enhance travel experiences, digitizing marketing and promotion methods for tourist destinations, and developing online booking and management processes to offer experiences enriched with modern digital applications (Ministry of Communications and Information Technology, 2023, p. 10).

1/2 Importance of Digital Tourism:

The importance of digital tourism includes the following:

- Keeping pace with current technological transformations in the business and commerce sector and enhancing adaptability to the requirements of the digital age and electronic work environments (Beatrice & Mihălcescu, 2013, p. 289).
- Enabling the design of digital spatial maps for tourist sites, activating location-based applications, choosing the best routes, and integrating with smart transportation systems for easier access to tourist facilities (Krishan et al., 2016, p. 65).
- Developing tourism products and services and innovating new tourism activities that align with changing tourist tastes and cater to different tourist segments (Hamza & Mohammad, 2017, p. 11).
- Reducing the costs of tourism services and activities by minimizing the role of travel agencies, along with the ability to compare available tourism services in the market in terms of quality and price (Lama et al., 2018, p. 2).
- Enabling tourist participation in the tourism industry by digitizing the tourist's journey through pre-travel planning, comparison, and booking, travel-stage engagement and discovery, and post-travel social interaction, loyalty, and social network sharing (Lakhder & Shnabi, 2018, p. 10).
- Promoting the principles of sustainable tourism development, supporting technological investments in the tourism sector, and reducing the environmental impact of tourism activities (Mohammad, 2019, p. 495).
- Enhancing the competitiveness of tourism companies, contributing to increased revenue, profit generation, and added value in the tourism industry (Qasuri, 2021, p. 57).
- Assisting tourism companies in influencing tourist's behavior by capturing attention, introducing tourism products, shaping public opinion, influencing purchase

decisions, and facilitating evaluation and communication with tourists before, during, and after their trips (Al-Rubaie, 2022, p. 6).

1/3 Characteristics of Digital Tourism:

The main characteristics of digital tourism are as follows:

1/3/1 Shift in Tourism Information Sources from Experts to Influencers: Traditional sources of tourism information were limited to tourism industry experts and traditional tourism media, including broadcast, print, and written media. However, digital tourism information sources have changed to include websites, social media, and mobile applications. Currently, around 90% of tourists plan their trips online (Deane, 2021, p. 1). Peers, influencers, and travel bloggers now play a vital role in promoting tourist destinations, with 72% of tourists reviewing other travelers' feedback before booking (Gretzel & Yoo, 2017, p. 339).

1/3/2 Shift in Tourism Services from Travel Agencies to Online Platforms: Digital tourism has enabled booking hotels and flights online through tourism websites, as well as access to various services such as car and bus rentals, cruises, and tickets to tourist attractions and museums through mobile applications (Pencarelli, 2020, p. 455). Currently, 82% of travel bookings are made online (Falata, 2021, p. 9).

1/3/3 Shift in Tourist Preferences and Behaviors from Individual to Collective: Online posts and comments play a significant role in influencing tourists' decisions regarding destination choices. Digital media has a substantial impact on directing tourist choices and behaviors, a phenomenon known as the synergistic effect of social media (Gretzel, 2019, p. 62).

1/3/4 Shift in Sharing Tourism Experiences from Private to Public: Traditionally, sharing travel experiences were limited to acquaintances and friends. However, in digital tourism, sharing has expanded to include blogs, social media platforms, and public digital content sharing. Interactive communication, comments, and emojis have become an essential part of the tourist experience, moving it from private to public domains. Approximately 60% of tourists share photos and videos of their trips on social media and receive engagement (Karr, 2018, p. 1).

1/4 Requirements for Activating Digital Tourism:

1/4/1 Technological Requirements: Digital tourism primarily relies on information and communication technology, requiring adequate hardware, devices, computers, suitable software for data processing, and technologies for storage, communication, and networks. These support the exchange of large-scale (internet), internal (intranet), and external (extranet) information (Alayan & Abir, 2017, p. 4).

1/4/2 Economic Requirements: Digital tourism depends on e-commerce principles, necessitating economic policies that support free exchange and movement, open skies, private sector support, tax relief, and integration into bilateral and multilateral agreements to liberalize trade in tourism services (Al-Uqab, 2016, p. 21).

1/4/3 Human Requirements: Digital tourism fundamentally relies on creativity and innovation in delivering tourism services and products, which necessitates enhancing the skills and capabilities of employees in the tourism sector, especially in terms of proficiency in using technological tools and techniques (Hamed, 2019, p. 85). Additionally, it requires training tourism personnel in technological methods and modern digital systems (Mohammad, 2019, p. 493).

1/4/4 Legal Requirements: These involve enacting and enforcing laws and regulations that ensure the protection of tourists in the digital tourism environment, particularly concerning electronic tourism contracts and personal data protection. They also include providing legal guarantees for the privacy of contractual relationships, transparency, quality of advertised services, and security of electronic payment transactions (Orwan, 2019, p. 204).

3. Results

2 – Cybersecurity:

2/1 Definition of Cybersecurity:

According to the International Telecommunication Union, cybersecurity is a set of processes that involve implementing security measures, safeguards, and guidelines to manage risks related to information security and protect the cyber environment (Al-Hammami, 2021, p. 230). It also refers to activities and practices aimed at protecting financial, human, and informational resources related to information and communication technologies, reducing risks and threats they face, and restoring normalcy as quickly and cost-effectively as possible (Al-Dalabeh, 2021, p. 10). Cybersecurity involves securing information, communication networks, and computer systems. Additionally, it helps individuals, groups, organizations, and countries protect their organizational, financial, human, and informational resources to ensure they continue to perform their functions effectively (Al-Qahmani, 2020, p. 1018).

2/2 Objectives of Cybersecurity:

The primary objectives of cybersecurity are as follows (Limba et al., 2017, p. 560):

- 2/2/1 Confidentiality: Limiting access to or sharing of information exclusively to authorized individuals.
- 2/2/2 Integrity: Restricting information system management and data modifications to authorized individuals only.
- 2/2/3 Transparency: Implementing information management systems that ensure access to stored information or data within the organization's infrastructure is restricted to authorized personnel.

2/3 Types of Cyber Risks:

Data and information are exposed to various cyber risks posed by states, individuals, groups specializing in cyber hacking, service developers, infrastructure operators, and competing service providers (Al-Tahat, 2023, p. 13). Table (1) provides an overview of the main cyber risks and their classifications.

Table (1): Cyber Risk Classification

Researher	Type of risk	Explanation
Kott and Linkov 2019	Risks of Unauthorized Access	Accessing and Spying on Bank Data
	Risks of Data Misuse	made by authorized bank employees when they modify data and information.
	Risks of Service Disruption or Denial	Disconnecting Devices, Networks, and Servers between parties located inside and outside the bank.
	Modification of Data During the Exchange Process	Modification of Data Before Reaching the Recipient
	Fabrication of Data Exchange Process	Fabricating or Creating a Data Exchange Process by the Attacker to Confuse the Victim
Moschovitis , Refsdal et al. 2015, Lesczyne et al. 2019, 2018	Harmful Programs	Spyware, Malware, Viruses, and Digital Worms
	Complete or Partial Disabling of Access to IT Infrastructure Components	
	Phishing	It occurs through deceiving the victim with fraudulent communications sent to their email.
	Eavesdropping and Hijacking Attacks	Infiltrating communication networks between parties to involve them in a specific deal.
	Denial of Service Attack	Attacks by sending a large number of requests that overload networks or servers.

	SQL Injection	SQL injection aimed at modifying software instructions to reveal information stored in the system.
	Zero-Day Exploits	Exploitation occurs when attackers monitor the victim's security measures.
Diogens Donaldson et al. and Ozkaya 2018	Application Risks	Cyberattacks target banking applications in multiple ways, particularly through internet-related emails
	Communication Network Risks	Cyberattacks exploit banking communication networks to take control of critical technology infrastructure components
	System Risks	Cyberattacks target banking systems in managing and executing activities within their systems, causing damage to those banks
	Endpoint, Server, and Device Security Risks	Cyberattacks exploit endpoints, servers, and device security in banks, using viruses that spread over the internet, malware, or zero-day exploits
	Identity, Access, and Authentication Risks	Exploiting security vulnerabilities in endpoints or applications or relying on weak network authentication methods to escalate their privileges in accessing networks or impersonating legitimate users to use authentication data
	Data Encryption Risks	This encryption serves both the defender and the attacker equally effectively.

2/4 Types of Cybersecurity:

Cybersecurity measures encompass four main types of protections, which include:

- 2/4/1 Information Security: This refers to ensuring the integrity and privacy of data throughout all stages of the information life cycle.
- 2/4/2 Operational Security: This relates to the integrity of operational procedures, monitoring tasks, and managing processes that handle data within the organization, ensuring access to data at the right time and place (Al-Janfaoui, 2021, p. 85).
- 2/4/3 Network Security: Encompasses measures to protect internal and external networks connected to computer systems from various cyber threats and malicious software, securing access to search engines (Al-Samhan, 2020, p. 14).
- 2/4/4 Application Security: Involves measures to safeguard software within information systems and provide modern applications that protect data at the design stage, including email security and mobile application security (Al-Tuwayisi, 2024, p. 43).

Third: Practical Aspect of the Study

1 – Methodological Framework of the Study:

- 1/1 Questionnaire Design:

The questionnaire was designed to collect data for the field study and consisted of 28 questions divided into five sections. The first section focused on enabling digital tourism with six questions. The second section covered technological cybersecurity measures with eight questions. The third section addressed economic cybersecurity measures with six questions. The fourth section involved human cybersecurity measures with four questions, and the fifth section included legal cybersecurity measures with four questions.

1/2 Questionnaire Scale:

The questionnaire scale was structured according to a five-point Likert scale: (Strongly Disagree – Disagree – Neutral – Agree – Strongly Agree), as shown in Table (2).

Table (2): Questionnaire Scale

Scale	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Score	**1**	**2**	**3**	**4**	**5**
Range	**1.80-1.00**	**2.60- 1.80**	**3.40-2.60**	**4.20 – 3.40**	**5.00 – 4.20**

3. Reliability and Validity of the Questionnaire:

Table (3): Reliability and Validity Coefficients for the Questionnaire Sections

Axe	Dimension	No. of Items	Reliability Coefficient (Cronbach's Alpha)	Validity Coefficient (Self-Validity)
1	Activation of Digital Tourism	6	0.929	0.963
2	Technological Measures for Cybersecurity	8	0.828	0.909
3	Economic Measures for Cybersecurity	6	0.847	0.920
4	Human Measures for Cybersecurity	4	0.689	0.830
5	Legal Measures for Cybersecurity	4	0.807	0.898
All Axes		28	0.951	0.975

Table (3) shows that the values of Cronbach's Alpha coefficient used to measure the reliability of the questionnaire scale reached 0.951 across all axes, indicating a high degree of reliability in the questionnaire. The self-validity coefficient for all axes was 0.975. This indicates a high level of internal consistency in the questionnaire.

1.4 Sample Size:

The study used the Moser equation to determine the sample size of the random sample from the employees of tourism companies in the city of Mosul as follows:

$$Nd = \frac{Z2}{E2}$$

Where:

- Nd = Desired sample size
- ZZZ = Standard deviation or critical value (related to the confidence level)
- EEE = Margin of error or significance level

σ = Standard deviation, EEE = Significance level or confidence limit for the mean of the study community / Confidence level assuming that the standard deviation of the study community = 13.

Significance level = 2, and confidence level = 95 (1.96).

Therefore, (E_s_d = \text{Significance level} / \text{Confidence level} = 2 / 1.96 = 1.

So, (N_d = (13)^2 / (1)^2 = 169 / 1 = 169.

To round the number, 170 questionnaires were distributed. After excluding 40 questionnaires for incomplete data and unsuitability for statistical analysis, the number of valid questionnaires reached 130.

2 – Statistical Analysis of Study Variables:

First Axis: Activation of Digital Tourism:

Table (4) Descriptive Statistics for the Responses of the Study Sample Regarding the Activation of Digital Tourism.

Statements		Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Arithmetic mean	Standard deviation
The travel agency has a website that provides	Frequency	0	2	26	56	46	4.12	0.77
	Percentage %	0	1.5	20.0	43.1	35.4		

tourism services.								
. The travel agency uses email to inform clients about new tourism programs	Frequency	0	8	22	59	41	4.02	0.85
	Percentage %	0	6.2	16.9	45.4	31.5		
The travel agency relies on social media platforms to understand client needs	Frequency	0	4	14	58	54	4.24	0.76
	Percentage %	0	3.1	10.8	44.6	41.5		
The travel agency allows its clients to purchase tourism programs online.	Frequency	1	5	33	52	39	3.94	0.88
	Percentage %	0.8	3.8	25.4	40.0	30.0		
The travel agency allows its clients to use electronic payment methods.	Frequency	0	2	29	56	43	4.07	0.78
	Percentage %	0	1.5	22.3	43.1	33.1		
The travel agency offers virtual tours of tourist destinations on its website.	Frequency	0	6	32	55	37	3.94	0.84
	Percentage %	0	4.6	24.6	42.3	28.5		
Average							3.97	0.63

Table (4) shows the distribution of the study sample participants based on their opinions regarding the activation of digital tourism as follows:

1. The statement "The travel company has a website that provides tourism services" received a mean score of 4.12. This indicates that the response falls within the agreement range of (3.40 - 4.20).

2. The statement "The travel company uses email to inform clients about new tourism programs" received a mean score of 4.02. This indicates that the response falls within the agreement range of (3.40 - 4.20).
3. The statement "The travel company relies on social media platforms to understand customer needs" received a mean score of 4.24. This indicates that the response falls within the completely agree range of (4.20 – 5.00).
4. The statement "The travel company allows its clients to purchase tourism programs online" received a mean score of 3.94. This indicates that the response falls within the agreement range of (3.40 - 4.20).
5. The statement "The travel company allows its clients to use electronic payment methods" received a mean score of 4.07. This indicates that the response falls within the agreement range of (3.40 - 4.20).
6. The statement "The travel company offers virtual tours of tourist destinations on its website" received a mean score of 3.94. This indicates that the response falls within the agreement range of (3.40 - 4.20).

Second Axis: Technological Measures for Cybersecurity:

Table (5) Descriptive Statistics for the Responses of the Study Sample Regarding Technological Measures for Cybersecurity.

Statements		Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Arithmetic mean	Standard deviation
The travel agency has the latest technological devices and equipment.	Frequency	0	13	21	57	39	3.93	0.92
	Percentage %	0	10.0	16.2	43.8	30.0		
The travel agency contracts with specialized information security authorities to protect its data.	Frequency	0	19	25	46	40	3.82	1.03
	Percentage %	0	14.6	19.2	35.4	30.8		
The travel agency uses original software to protect computers from harmful viruses.	Frequency	7	5	17	73	28	3.84	0.98
	Percentage %	5.4	3.8	13.1	56.2	21.5		
There is a password used by employees to access information files.	Frequency	1	11	18	56	44	4.00	0.94
	Percentage %	0.8	8.5	13.8	43.1	33.8		
	Frequency	0	10	30	49	41	3.93	0.92

No one is allowed to access the company's files and information.	Percentage %	0	7.7	23.1	37.7	31.5		
The travel agency maintains a secure and protected electronic database for customer data.	Frequency	0	16	23	63	28	3.79	0.92
	Percentage %	0	12.3	17.7	48.5	21.5		
The travel agency ensures regular updates of computer protection programs against viruses.	Frequency	3	6	28	51	42	3.94	0.96
	Percentage %	2.3	4.6	21.5	39.2	32.3		
The travel agency does not allow the exchange of customer data with external parties.	Frequency	3	13	22	68	24	3.74	0.95
	Percentage %	2.3	10.0	16.9	52.3	18.5		
Average							3.81	0.65

Table (5) shows the distribution of the study sample participants based on their opinions regarding the technological measures for cybersecurity as follows:

1. The statement "The travel company has the latest technological devices and equipment" received a mean score of 3.93. This indicates that the response falls within the agreement range of (3.40 - 4.20).
2. The statement "The travel company contracts with specialized bodies in information security to protect its data" received a mean score of 3.82, indicating that the response falls within the agreement range of (3.40 - 4.20).
3. The statement "The travel company uses original software to protect computers from harmful viruses" received a mean score of 3.84, indicating that the response falls within the agreement range of (3.40 - 4.20).
4. The statement "There is a password used by employees to access information files" received a mean score of 4.00, indicating that the response falls within the agreement range of (3.40 - 4.20).
5. The statement "No one is allowed to access the company's files and information" received a mean score of 3.93. This indicates that the response falls within the agreement range of (3.40 - 4.20).

6. The statement "The travel company maintains a secure electronic database for customer data" received a mean score of 3.79, indicating that the response falls within the agreement range of (3.40 - 4.20).
7. The statement "The travel company ensures regular updates to computer protection programs against viruses" received a mean score of 3.94, indicating that the response falls within the agreement range of (3.40 - 4.20).
8. The statement "The travel company does not allow the exchange of customer data with external parties" received a mean score of 3.74. This indicates that the response falls within the agreement range of (3.40 - 4.20).

Third Axis: Economic Measures for Cybersecurity:

Table (6) Descriptive Statistics for the Responses of the Study Sample Regarding Economic Measures for Cybersecurity.

Statements		Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Arithmetic mean	Standard deviation
The travel agency provides the necessary financial allocations to purchase information security programs.	Frequency	5	1	11	57	56	4.21	0.92
	Percentage %	3.8	0.8	8.5	43.8	43.1		
The travel agency considers investment in information security as a form of digital competitive advantage.	Frequency	3	4	19	48	56	4.15	0.94
	Percentage %	2.3	3.1	14.6	36.9	43.1		
The travel agency allows any tourist the freedom to purchase tourism programs without discrimination based on race, religion, or language.	Frequency	0	20	39	39	32	3.63	1.01
	Percentage %	0	15.4	30.0	30.0	24.6		
The travel agency encourages incoming tourism from abroad in accordance	Frequency	0	9	36	57	28	3.80	0.85
	Percentage %	0	6.9	27.7	43.8	21.5		

with an open skies policy.								
The travel agency does not impose any restrictions on domestic tourism for political, racial, or sectarian reasons.	Frequency	1	4	15	54	56	4.23	0.83
	Percentage %	0.8	3.1	11.5	41.5	43.1		
Cybersecurity helps the tourism company expand its market share.	Frequency	1	7	20	60	42	4.03	0.87
	Percentage %	0.8	5.4	15.4	46.2	32.3		
Average							4.02	0.60

Table (6) shows the distribution of the study sample participants based on their opinions regarding the economic measures for cybersecurity as follows:

1. The statement "The travel company provides the necessary financial allocations to purchase information security programs" received a mean score of 4.21, indicating that the response falls within the full agreement range of (4.20 – 5.00).
2. The statement "The travel company considers investing in information security as a form of digital competitive advantage" received a mean score of 4.15, indicating that the response falls within the agreement range of (3.40 - 4.20).
3. The statement "The travel agency allows any tourist the freedom to purchase tourism programs without discrimination based on race, religion, or language" received a mean score of 3.63. This indicates that the response falls within the agreement range of (3.40 - 4.20).
4. The statement "The travel agency encourages incoming tourism from abroad according to an open skies policy" received a mean score of 3.80, indicating that the response falls within the agreement range of (3.40 - 4.20).
5. The statement "The travel company does not impose any restrictions on domestic tourism movement for political, racial, or sectarian reasons" received a mean score of 4.23, indicating that the response falls within the full agreement range of (4.20 – 5.00).
6. The statement "Cybersecurity helps the travel company expand its market share" received a mean score of 4.03, indicating that the response falls within the agreement range of (3.40 - 4.20).

Fourth Axis: Human Measures for Cybersecurity:

Table (7) Descriptive Statistics for the Responses of the Study Sample Regarding Human Measures for Cybersecurity.

Statements		Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Arithmetic mean	Standard deviation
There is a specialized information	Frequency	2	1	26	39	62	4.22	0.87
	Percentage %	1.5	0.8	20.0	30.0	47.7		

security officer at the travel agency.								
The travel agency is keen on hiring qualified professionals and specialists in the field of cybersecurity.	Frequency	2	1	18	64	45	4.14	0.79
	Percentage %	1.5	0.8	13.8	49.2	34.6		
Meetings are held with employees to explain cybersecurity risks and threats.	Frequency	1	11	16	50	52	4.08	0.96
	Percentage %	0.8	8.5	12.3	38.5	40.0		
The travel agency provides specialized technical training in the field of cybersecurity for its employees.	Frequency	1	19	28	44	38	3.76	1.05
	Percentage %	0.8	14.6	21.5	33.8	29.2		
	Percentage %	2	1	26	39	62		
Average								

Table (7) shows the distribution of the study sample participants based on their opinions regarding human measures for cybersecurity as follows:

1. The statement "There is a specialized information security officer in the travel company" received a mean score of 4.22, indicating that the response falls within the full agreement range of (4.20 – 5.00).
2. The statement "The travel company is keen on hiring qualified professionals and specialists in the field of cybersecurity" received a mean score of 4.14, indicating that the response falls within the agreement range of (3.40 - 4.20).
3. The statement "Meetings are held with employees to explain the risks and cyber threats" received a mean score of 4.08, indicating that the response falls within the agreement range of (3.40 - 4.20).
4. The statement "The travel company provides employees with specialized technical training in cybersecurity" received a mean score of 3.76, indicating that the response falls within the agreement range of (3.40 - 4.20).

Fifth Axis: Legal Measures for Cybersecurity:

Table (8) Descriptive Statistics for the Responses of the Study Sample Regarding Legal Measures for Cybersecurity.

Statements		Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Arithmetic mean	Standard deviation
The tourism company is subject to monitoring by relevant authorities for its tourism programs.	Frequency	0	4	24	68	34	4.01	0.75
	Percentage %	0	3.1	18.5	52.3	26.2		
	Frequency	0	3	18	72	37	4.10	0.71

The tourism company complies with consumer protection laws and ensures customer rights.	Percentage %	0	2.3	13.8	55.4	28.5		
The tourism company establishes regulations to protect customer data.	Frequency	0	21	23	40	46	3.85	1.07
	Percentage %	0	16.2	17.7	30.8	35.4		
Security authorities are notified of any data security breaches.	Frequency	0	16	25	50	39	3.86	0.98
	Percentage %	0	12.3	19.2	38.5	30.0		
	Percentage %	0	4	24	68	34		
Average								

Table (8) shows the distribution of the study sample participants based on their opinions regarding legal measures for cybersecurity as follows:

1. The statement "The travel company is subject to monitoring by the relevant authorities regarding its tourism programs" received a mean score of 4.01, indicating that the response falls within the agreement range of (3.40 - 4.20).
2. The statement "The travel company complies with consumer protection laws and ensures customer rights" received a mean score of 4.10, indicating that the response falls within the agreement range of (3.40 - 4.20).
3. The statement "The travel company establishes the necessary regulations to protect customer data" received a mean score of 3.85, indicating that the response falls within the agreement range of (3.40 - 4.20).
4. The statement "Security authorities are notified of any data security breaches" received a mean score of 3.86, indicating that the response falls within the agreement range of (3.40 - 4.20).

3 - Testing the Validity of the Study Hypotheses:

The study used the Pearson correlation coefficient using SPSS, version 24, to test the validity of the hypotheses as shown in Table (9).

Table (9) shows the results of the correlation matrix between cybersecurity measures and the requirements for activating digital tourism.

Variables	Activation of digital tourism	Technological measures	Economic measures	Human measures	Legal measures
Activation of Digital Tourism	1.000				
Technological Measures	0.623	1.000			
Economic Measures	0.627	0.687	1.000		
Human Measures	0.660	0.732	0.654	1.000	

Legal Measures	0.750	0.722	0.713	0.716	1.000

The correlation is statistically significant at a significance level of 0.05.

The analysis of the data in Table (9) indicates the following:

1. There is a positive correlation between technological measures of cybersecurity and the requirements for activating digital tourism, which amounted to 0.623. This supports the first hypothesis, which states that there is a statistically significant correlation between technological measures of cybersecurity and the response to digital tourism requirements in travel companies in the city of Mosul.
2. There is a positive correlation between economic measures of cybersecurity and the requirements for activating digital tourism, which amounted to 0.627. This supports the second hypothesis, which states that there is a statistically significant correlation between economic measures of cybersecurity and the response to digital tourism requirements in travel companies in the city of Mosul.
3. There is a positive correlation between human measures of cybersecurity and the requirements for activating digital tourism, which amounted to 0.660. This supports the third hypothesis, which states that there is a statistically significant correlation between human measures of cybersecurity and the response to digital tourism requirements in travel companies in the city of Mosul.
4. There is a positive correlation between legal measures of cybersecurity and the requirements for activating digital tourism, which amounted to 0.750. This supports the fourth hypothesis, which states that there is a statistically significant correlation between legal measures of cybersecurity and the response to digital tourism requirements in travel companies in the city of Mosul.

4. Discussion

The role of cybersecurity in facilitating the activation of digital tourism has become increasingly pivotal in recent years, especially as tourism companies in cities like Mosul embrace digital transformation. This study highlights a significant correlation between various cybersecurity measures—technological, economic, human, and legal—and the successful integration of digital tourism. With the rise of online booking platforms, social media promotions, and mobile applications in the tourism sector, the implementation of robust cybersecurity protocols becomes essential to protect sensitive data and maintain customer trust.

The findings from the survey conducted on tourism companies in Mosul underscore the importance of addressing cybersecurity risks to ensure the smooth operation of digital tourism initiatives. The relationship between the adoption of cybersecurity measures and the advancement of digital tourism is apparent, as the security of information systems directly impacts the accessibility and reliability of digital tourism services. This is particularly important in light of the vulnerabilities identified in tourism sectors globally, where cyber-attacks, data breaches, and identity theft can undermine the industry's reputation and growth potential.

Moreover, the study suggests that the government and tourism authorities, such as the Ministry of Tourism, should collaborate to set clear cybersecurity standards and offer certifications to tourism businesses that meet these requirements. Such measures would not only enhance the protection of customer information but also foster an environment of trust, encouraging more tourists to engage with digital tourism platforms. The training of employees to identify and respond to cybersecurity threats is also crucial, as human error is often one of the weakest links in digital security systems.

Overall, while digital tourism holds immense potential for enhancing the tourist experience and driving economic growth, the successful integration of these technologies hinges on addressing the associated cybersecurity challenges. Effective cybersecurity strategies, combined with collaboration between the public and private sectors, will be essential in realizing the full potential of digital tourism in Mosul and similar regions.

5. Conclusion

1. The importance of digital tourism lies in keeping pace with global developments in the field of information technology and e-commerce, innovating new tourism products, enhancing interaction with tourists, reducing the costs of tourism services, and supporting competitiveness in the tourism market.
2. The main characteristics of digital tourism include the shift in sources of tourism information from experts to influencers, the shift in tourism services from travel companies to websites, the shift in tourists' choices and behaviors from individual to collective, and the shift in sharing tourism experiences from privacy to publicity.
3. The requirements for activating digital tourism include technological requirements based on information technology, economic requirements according to the principles of e-commerce, human requirements based on the expertise and technological capabilities of workers in the tourism sector, and legal requirements through compliance with consumer protection regulations and ensuring tourists' rights.
4. The main goals of cybersecurity are confidentiality, integrity, and transparency.
5. The most significant types of cyber risks include denial of service attacks, unauthorized access to databases, electronic attacks and cyber piracy, computer viruses, data encryption, and illegal exploitation of customer data.
6. Cybersecurity measures consist of four types: information security measures, operational security measures, network security measures, and application security measures.
7. The results of the applied study indicate a strong correlation between technological, economic, human, and legal cybersecurity measures and the requirements for activating digital tourism.

Recommendations:

1. Utilize modern technological tools and means for digital tourism promotion and effective communication with tourists to introduce them to the tourism programs offered by travel companies.
2. Establish a dedicated cybersecurity department within travel companies and provide the necessary electronic security devices and software for information security.
3. Collaborate with the Ministry of Tourism to provide cybersecurity services for travel companies and coordinate with specialized security agencies in information security.
4. Strengthen cooperation between the Cybersecurity Center and the Ministry of Tourism to issue a special certificate for travel companies that implement cybersecurity measures.
5. Report cyber attacks and data breaches to security authorities and assist in investigations to ensure the activation of cybersecurity measures.
6. Prepare training courses for workers in travel companies on using information security software and addressing cyber threat risks.
7. Develop proactive emergency plans to counter cyber piracy and handle data breach attempts to maintain the confidentiality of customer data.

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