**International Journal of Studies in Business Management, Economics and Strategies**
Volume 4, Issue 3, March - 2025
ISSN (E): 2949-883X
Scholarsdigest.org

# EMPLOYING ARTIFICIAL INTELLIGENCE TO TRANSFORM INTO SMART HOTELS IN KARBALA

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**Abstract**
The research aims to focus on artificial intelligence applications as a model for transforming tourist hotels in the holy Karbala Governorate into smart hotels, and exploring the challenges and opportunities facing this transformation? Artificial intelligence improves competitive capabilities, as well as providing personalized experiences for guests based on their preferences and expectations. (75) questionnaires were distributed to hotel managers, receptionists, hotel services managers, restaurant managers, and maintenance officers. The questionnaire consisted of (20) questions and was analyzed using a Likert scale (Five Point Likert Scale). The results showed that the independent variable (artificial intelligence) and its sub-dimensions (technical, organizational, and cultural) have a relationship and influence on the dependent variable (smart hotels), and that hotels' investment in the artificial intelligence factor will ensure their future success, in addition to their ability to keep pace with the services they have that meet the needs of guests in the digital age.

**Keywords**: Artificial Intelligence, Traditional Hotels, Smart Hotels.

## Introduction

In the era of modern technology, artificial intelligence has become one of the most important tools that industries rely on to improve their operational efficiency and increase their competitiveness. The tourism industry considers smart hotels an advanced model in its reliance on modern technology to provide unique experiences for guests, while traditional hotels suffer from multiple challenges, such as: high operating costs, difficulty in managing human resources, and the inability to meet guests' expectations. This is where artificial intelligence comes in as an innovative solution that can improve hotel organizations' management, operational processes, and provide personalized guest experiences. Tourism reports indicate that the artificial intelligence market in the hospitality industry is expected to grow from (4.5) billion dollars in 2022 to (10.7) billion dollars by 2030, at a compound annual growth rate (CAGR) of (10.9%) (Grand View Research, 2023). (68%) of global hotels use or plan to use AI to improve guest experience, such as providing personalized recommendations for tourist activities or meals and drinks (Hospitality Technology, 2022), while hotels using AI have seen a (35%) increase in customer satisfaction due to improved speed of service and personalized experiences for guests (Oracle Hospitality, 2021), and a (20-30%) decrease in energy costs (McKinsey & Company, 2022).

They are (25%) of the world's luxury hotels have also turned to using robots to provide hotel services, such as: luggage delivery or room cleaning (Statista, 2023), and (40%) of major hotels use artificial intelligence to improve human resources management by distributing tasks and evaluating employee performance (Deloitte, 2023).

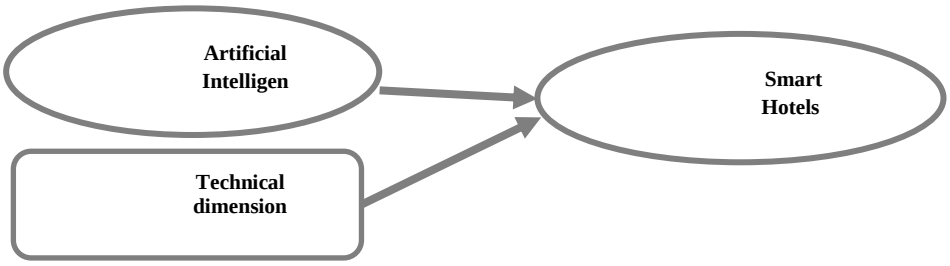
**Research problem**: With the rapid technological development, smart hotels are increasingly relying on artificial intelligence technologies, and many tourist destinations are seeking to adopt smart solutions to improve operational efficiency and enhance the guest experience. Karbala hotels are among the hotel establishments that can benefit from these transformations, especially in light of the large numbers of visitors who visit the city annually for religious and touristic purposes; The following questions arise from the research problem:
- What are the applications of artificial intelligence in smart hotel management?
- How can artificial intelligence enhance smart hotel management?
- What are the challenges that may face the application of artificial intelligence in this field?
- What are the opportunities available to achieve this transformation?

**Research objectives**: The research aims to study and explore the challenges and opportunities for applying the artificial intelligence program, understand the challenges facing smart hotels in applying artificial intelligence and propose solutions to improve them, in addition to the following sub-objectives:
1. Analyzing the readiness of hotels in Karbala to adopt artificial intelligence technologies.
2. Exploring the technical, human and economic challenges that hinder the shift towards smart hotels.
3. Providing solutions and proposing strategies to help traditional hotels transform digitally.
4. Evaluating the impact of artificial intelligence on customizing services and improving the guest experience.
5. Determining the extent to which artificial intelligence contributes to improving energy management and reducing operating costs.
6. Benefiting from successful global experiences, and providing practical models to benefit from their application in Karbala.

**Importance of the research**:
1. It contributes to enriching the literature on smart hotel management and linking it to artificial intelligence applications, especially in an environment known for its religious nature, which is the holy Karbala Governorate; which makes it a qualitative addition to the scientific literature on smart hotels.
2. The research provides applied models that enable traditional hotel owners in Karbala to benefit from them, as it helps them improve their hotel services.
3. Artificial intelligence can contribute to attracting visitors, increasing their satisfaction, and enhancing the competitiveness of hotels, in addition to increasing hotel revenues, and enhancing the city's reputation as an advanced tourist destination.
4. Adopting modern technologies, such as: artificial intelligence, the Internet of Things, and robotics in the hospitality sector, paves the way for the development of digital infrastructure

in Karbala, which enables it to keep pace with global trends, and the efficiency of resource use, in addition to enhancing the competitiveness of smart hotels in the tourism market.

**Research hypotheses**: By reviewing the following hypothetical research outline.




(1) **The first main hypothesis**:

$H_0$: There is no significant positive correlation between artificial intelligence and smart hotels.

$H_1$: There is a significant positive correlation between artificial intelligence and smart hotels.

- **Sub-hypotheses**:

Hypothesis (1):

$H_0$: There is no significant positive correlation between technical challenges and smart hotels.

$H_1$: There is a significant positive correlation between technical challenges and smart hotels.

Hypothesis (2):

$H_0$: There is no significant positive correlation between organizational challenges and smart hotels.

$H_1$: There is a significant positive correlation between organizational challenges and smart hotels.

Hypothesis (3):

$H_0$: There is no significant positive correlation between cultural challenges and smart hotels.

$H_1$: There is a significant positive correlation between cultural challenges and smart hotels.

(2) **The second main hypothesis**:

$H_0$: There is no significant positive influence relationship between artificial intelligence and smart hotels.

$H_1$: There is a significant positive influence relationship between artificial intelligence and smart hotels.

- **Sub-hypotheses**:

Hypothesis (4):

$H_0$: There is no significant positive influence relationship between technical challenges and smart hotels.

$H_1$: There is a significant positive influence relationship between technical challenges and smart hotels.

Hypothesis (5):

$H_0$: There is no significant positive influence relationship between organizational challenges and smart hotels.

$H_1$: There is a significant positive influence relationship between organizational challenges and smart hotels.

Hypothesis (6):

$H_0$: There is no significant positive influence relationship between cultural challenges and smart hotels.

$H_1$: There is a significant positive influence relationship between cultural challenges and smart hotels.

**Research Methodology**

The research is based on the descriptive analytical approach, by studying the current reality of hotels in Karbala, and analyzing their readiness for digital transformation, in addition to conducting a field study on a sample of hotel owners and workers in the field. Successful international experiences in the field of smart hotels will also be reviewed to benefit from them in the local context. Thus, the research seeks to provide an integrated vision that helps decision-makers in the hotel sector achieve a successful and sustainable digital transformation in the holy city of Karbala.

**Theoretical conceptual framework**:

(1) **Artificial Intelligence**:

Researchers emphasize the importance of promoting new business models in entrepreneurship, and transcending cultural boundaries related to ICT; because of its ability to respond to the need, as well as to revitalize areas socially and economically, especially areas characterized by low economy (Esteban-Navarro et al., 2020: 12), as over time an increasing number of individuals will be born in the digital world who grow up surrounded by ICT; this will lead to a better understanding of this technology and its complexities (Cruz-Jesús et al., 20218: 5).

Artificial intelligence consists of two words: the word artificial, which refers to something created by humans, and the word intelligent, which refers to the ability to think. Therefore, artificial intelligence is defined as one of the forms of thinking power created by humans (Limna et al., 2021: 2). Artificial intelligence (AI) is a field of computer science that aims to develop computer systems capable of performing tasks that require human intelligence, such as: learning, decision-making, and data analysis. AI is used in the tourism industry to improve the overall tourist experience, the guest experience in hotels, and to increase operational efficiency (564: Buhalis & Sinarta, 2019). Artificial intelligence applications work to integrate existing information exchange systems by analyzing data from different sources in order to provide what helps the recipient make the best decision (Herold et al., 2025: 170).

The computer system allows for the rapid provision of statistics, as well as the analysis of each word from the billions of words it collects from the Internet and links its relationship to the words surrounding it. Here, artificial intelligence works as a tool for predicting the next word, and artificial intelligence is programmed with written text in the form of textual

demands that respond to the requirements found in the written text (Kalantzis, & Cope, 2025: 6).

(2) **Dimensions of Artificial Intelligence**:

2-1: **The technical dimension**: This dimension is related to the preparation of digital infrastructure, and the extent of the hotel management's readiness to provide and invest in it, in addition to training workers with the technological development that we are witnessing today, and the extent of the increase in the costs related to that, in addition to incentives and wage increases that lead to an increase in total costs.

2-2: **The organizational dimension**: It depends on the nature of the complex organizational structures in the hotel organization, and the presence of traditional leadership that does not support the new philosophy, whether in energy management and cost reduction, as well as in improving safety and monitoring systems, in addition to guest data analysis processes to study the services provided to guests and their preferences.

2-3: **The cultural dimension**: This dimension is related to the internal and external environments of the hotel organization. The organization's culture may reflect weakness in awareness and unwillingness to delegate authority and responsibilities, and this is considered a secondary matter (Al-Gharib, 2024: 328).

(3) **Smart Hotels**:

Today, hotels are witnessing a significant and noticeable development in the use of technology in various and multiple service areas, as the guest is looking for an experience that is more suitable for his personality, and even looks for a wide range of features that work to improve every aspect of his stay; therefore, his needs and expectations are met by designing smart applications that enhance his attraction to the hotel, and work to serve him, such as: hotel reservations, tourist transportation, and other services in the field of electronic application (Maglovska, 2025: 1005). Those hotels that apply technology in providing their services are called smart hotels.

Artificial intelligence provides unique opportunities to improve marketing and guest service, improve guest experience, and thus retain them. Artificial intelligence has been integrated into hotel systems through advanced sensing systems, comprehensive hotel service delivery systems, and in controlling room temperature before arrival and sensing lighting. This has led to cost savings on the one hand, and resource conservation on the other (Salama, 2023: 112). Smart hotels are those that rely on modern technology, such as artificial intelligence, to provide customized services and improve the guest experience. These hotels have integrated management systems that control lighting, heating, air conditioning, and room requests, which helps provide a smooth and efficient experience for guests (Ivanov & Webster, 2019: 7).

Traditional hotels rely on human services in all their operational processes, such as: check-in and check-out, providing room services via telephone, relying on employees to provide information and training, and the direct human element in all services. As for the challenges they face in this: high operating costs due to reliance on employees, and in providing hotel services, with the possibility of human errors in managing reservations and services. Smart

hotels employ the Internet of Things (IoT), which are smart programs that have the ability to communicate with each other and participate effectively in daily life (Mouha, 2021: 77). Smart hotels have adopted artificial intelligence programs in providing their services, which leads to direct login and reception via phone applications, providing a virtual assistant in the voice operations room, using data analysis and artificial intelligence to understand the preferences of potential customers for a personalized experience, and smart security systems, such as: facial recognition and the self-camera. In doing so, they achieve reduced operating costs and operational costs, and provide a personalized hospitality experience for each guest, in addition to improving the speed of services provided to the guest.

The hotel's ability to maximize its inputs (resources) depends on reducing costs on the one hand, and reducing waste of resources on the other hand through operational efficiency, in addition to many aspects of service provision, energy management, and improving the guest experience, according to the successes of hotel resource management (Jones & Li, 2020: 102).

(4) **Artificial intelligence applications in smart hotels**:

a. Virtual reality: Achieving interaction through an experience to simulate the hotel environment, which allows the imagination to be physically present to achieve interaction (Salama, 2023: 111). Virtual reality enables visiting hotels virtually and knowing their locations, which helps tourists access the information they need. It also enables them to interact with the physical environment using virtual mobiles, in addition to interactive displays of their tourist destination, which leads to increasing their entertainment level (Doborjeh et al., 2022: 1155).

b. Food Safety: With the increasing risks of food safety from fraud, artificial intelligence systems are a black box due to the difficulty of interpreting their performance, and they predict and detect many cases of food fraud risks (Buyuktepe et al, 2023: 1).

c. Information: Potential guests attach great importance to room information, content and quality of rooms, as well as the guests' desire for the room control function, which enables them to operate all smart devices in the room. This feature is more complex and expensive, but it constitutes a distinguishing mark between the traditional hotel and the smart hotel that relies on digital technology (Maglovska, 2025: 1007). Guests, whether on a business trip or a touristic tour, always prefer to know about nearby tourist attractions and the roads leading to them even before making the reservation procedures, and guests feel happy with the digital features provided by hotel management that are available to them in the hotel (Lu et al., 2015: 1061). AI also analyzes and identifies guest preferences and provides personalized recommendations for tourist activities and meals. Previous studies have shown that the use of AI in smart hotels has improved energy management efficiency by (25%) and increased guest satisfaction by (30%) (Ivanov et al, 2020: 11).

d. Human resource management: Using artificial intelligence to analyze human resource data and determine the best ways to distribute tasks (Gursoy et al., 2019: 2).

e. Energy management: The hotel uses smart systems to monitor energy consumption and reduce operating costs. Guests can use smart control systems to control room lighting,

temperature, and TV via a smartphone app. Artificial intelligence is also used to monitor energy consumption and provide recommendations to reduce costs (Li et al., 2021: 3).

f. Robots: The hotel uses robots in the place of the receptionist, carrying and delivering luggage, a doorman, a waiter, and servants, in addition to chatbots, and other hotel services (Collins, 2017: 425), in addition to employing chatbots in providing hotel services, as they conduct conversations with guests, and immediately answer their inquiries around the clock, in addition to saving time, building social relationships with guests, building bridges of trust with them, strengthening their emotional bonds, appointments, scheduling reminders, booking tickets, and reviewing traffic and weather updates, in addition to helping in identifying airlines, restaurants, and booking entertainment sites (Battour et al., 2022: 863).

g. Smart bracelet: It is one of the technologies that work very similarly to smart watches. It is part of the Internet of Things, and stores and transfers data. The smart bracelet provides many services, including: guest information, monitoring their health status and data, monitoring oxygen measurements, and pulse rates, in addition to providing a service to request medical assistance, and it also provides awareness messages (Abalkhail & Al Amri, 2022: 14143).

h. Decision-making: By using data to make strategic decisions by departments effectively (Li et al., 2021: 6).

(5)**Challenges of applying artificial intelligence in smart hotels**:

Despite the many benefits of implementing AI, there are challenges facing smart hotels in adopting these technologies:

a. High cost: The costs of developing and implementing AI systems are high, especially in small and medium-sized hotels (Ivanov & Webster, 2019).

b. Data protection: Guarantees must be provided for the security and privacy of guests' data, with this trend towards increased use of technology (Gretzel et al., 2021: 3).

c. Training: Human resources need continuous training on how to use smart systems effectively (Li et al., 2021: 5).

(6)**Smart hotel models**:

a. **YOTEL Dubai Hotel - United Arab Emirates**: It applies robots, smart control systems, energy management, and service customization. Its use has led to a 25% increase in customer satisfaction, a 20% decrease in energy costs, and a 30% improvement in service delivery speed. However, management faced challenges in high implementation costs, employee training, and data protection.

b. **Henn-na Hotel - Japan**: Artificial intelligence is applied through robots in reception, room cleaning, and luggage delivery. The results were: reducing labor costs by (40%), increasing occupancy by (15%), and improving the guest experience through interaction with robots. The challenges it faced were the difficulty of robots interacting with guests at times, and the high maintenance costs.

c. **Aloft Cupertino – USA**: Implemented robots for order delivery, smart control systems, and big data analysis, and achieved results in increasing customer satisfaction by (20%), improving human resource management efficiency by (25%), and reducing guest waiting time

by (35%), while facing challenges in implementation costs, and the need for guests to adapt to new technology.

We can compare the AI applications for hotels that we mentioned in the following table:

| Hotel / Standard | YOTEL Dubai Emirates | Henn-na Hotel Japan | Aloft Cupertino USA |
|---|---|---|---|
| **Main Applications** | - Robotics<br>- Intelligent control systems<br>- Energy management<br>- Service customization | - Reception robots<br>- Room cleaning<br>- Luggage delivery | - Robots for delivery of orders<br>- Intelligent control systems<br>- Big data analysis |
| **Increase Guest Satisfaction** | 25% | 15% | 20% |
| **Reduce Costs** | Energy (20%) | Labor (40%) | Human Resources (25%) |
| **Improve Speed** | 30% | undefined | 35% |
| **Challenges** | - High implementation costs<br>- Staff training<br>- Data protection | - Robot interaction<br>- High maintenance costs | - Application costs<br>- Guests adapt to new technology |

It is noted in the table; there is a similarity in the field of investment in artificial intelligence by all smart hotels used robots to improve the guest experience and reduce operational costs. They all witnessed an increase in guest satisfaction; due to the use of smart technology, while they faced challenges related to implementation costs and employee training. The differences were in the type of applications, as YOTEL Dubai focused on energy management and smart control, Henn-na Hotel focused on robots in reception and cleaning, and Aloft Cupertino focused on big data analysis. The difference in specific outcomes is also evident, as labor costs dropped significantly at the Henn-na Hotel, while HR efficiency improved at Aloft Cupertino. As for the challenges, Henn-na Hotel faced difficulties in getting robots to interact with guests, while Aloft Cupertino faced challenges in getting guests to adapt to the new technology. We conclude from the comparison:

- The importance of planning: Good planning has enabled hotels to apply artificial intelligence effectively.
- Staff training: Continuous staff training contributed to the success of the technology implementation.
- Evaluation of results: Periodic review of results by hotel managements helped to continuously improve services.

**Section Two: The Practical Aspect**:

The researcher presented his analytical presentation of the field research data by using statistical tools and methods to reach the results related to the research variables and the correlation and influence relationships between them, and to know the role of artificial intelligence in smart hotels. The researcher designed and prepared the questionnaire form, and collected data from the research sample members. The questionnaire form consisted of (4) axes, and each axis includes (5) questions, which emerged from some ideas and research variables by extrapolating previous studies, and taking into account the basic factors that

achieve the research objectives and hypotheses. The final formulation of the research tool was completed, which consisted of (20) questions. The researcher used a five-point Likert scale (Five Point Likert Scale).

As for the statistical methods that the researcher relied on in analyzing the data, they were by using the statistical program (SPSS), and using many statistical methods, including:

- Testing the validity of the questionnaire: using Cronbach's Alpha Scale test to determine the reliability of the research tool.
- Descriptive statistical analysis tools: The researcher relied on descriptive statistical methods, such as: Frequencies, Percentages, Means, and Standard Deviation, to help him display the data.
- Simple Linear Correlation Coefficient and Coefficient of Determination to test the relationship between the independent variable (artificial intelligence) and the dependent variable (smart hotels).
- Simple Linear Regression: to analyze the relationship between two variables.

(1) **Research sample**:

The research sample included hotel managers, receptionists, hotel services managers, restaurant managers, and maintenance officials. (75) questionnaires were distributed to them. The results of the questionnaire regarding the general information of the researched sample were as shown in Table No. (2) Description of the research sample.

**Table (2): Description of the research sample**

| Paragraph | Category | Frequency | Percentage |
|---|---|---|---|
| **Gender** | Male | 72 | 96% |
| | Female | 3 | 4% |
| **The total** | | 75 | 100% |
| **Age** | Less than 20 years | 2 | 2.67% |
| | (21 – 30) years | 47 | 62.67% |
| | (31 – 40) years | 15 | 20% |
| | (41 – 50) years | 6 | 8% |
| | (51) years and over | 5 | 6.66% |
| **The total** | | 75 | 100% |
| **Academic achievement** | High School | 2 | 2.67% |
| | Bachelor's | 71 | 94.66% |
| | Master's | 2 | 2.67% |
| | PhD | 0 | 0% |
| **The total** | | 75 | 100% |
| **Nature of work in the hotel** | Hotel Manager | 25 | 33.33% |
| | Receptionist | 23 | 30.67% |
| | Hotel Services Manager | 13 | 17.34% |
| | Restaurant Manager | 7 | 9.33% |
| | Maintenance Officer | 7 | 9.33% |
| **The total** | | 75 | 100% |

**Source**: Prepared by the researcher based on the questionnaire outputs.

(2) **Coding of research variables**:

The research variables, represented by the independent variable (artificial intelligence), and the dependent variable (smart hotels), as well as the dimensions of the independent variable and the dimensions of the dependent variable, were coded for the statistical operations related to analyzing the data extracted from the questionnaire form. The researcher relied on the program (SPSS - V27) for those operations. Table No. (3) represents the coding of the main and sub-research variables.

**Table (3): Coding and description of the main and sub-research variables**

| Coding | Variables |
|---|---|
| **X** | Artificial Intelligence |
| **X1** | Technical Dimension |
| **X2** | Organizational Dimension |
| **X3** | Cultural Dimension |
| **Y** | Smart Hotels |

**Testing the validity and reliability of the questionnaire**:

The researcher presented his research tool (the questionnaire form) to five arbitrators in the tourism and administrative specialization in order to achieve the final version of the modified questionnaire questions. The modification was made based on the opinions of the arbitrators, whose number reached (nine) arbitrators, in a manner consistent with the objectives of the research, and to achieve the apparent validity of the scale, and in accordance with what was stated in the questionnaire form, the contents of which we referred to previously. Table No. (4) shows the percentage of agreement of the arbitrators on the contents of the questionnaire questions.

**Table (4): Percentage of agreement of the arbitrators on the contents of the questionnaire**

| Variables | Number of questions | Number of agreed questions | Agreement percentage % |
|---|---|---|---|
| Technical Dimension | 5 | 5 | 100 |
| Organizational Dimension | 5 | 5 | 100 |
| Cultural Dimension | 5 | 4 | 80 |
| Smart Hotels | 5 | 5 | 100 |

As for the stability of the questionnaire, the researcher relied on the Cronbach's alpha method to find the stability coefficient of the questionnaire form in adopting its questions, and the value of the Cronbach's alpha coefficient was as shown in the following Table No. (5):

**Table (5): Cronbach's alpha coefficient value for the questionnaire's reliability and self-honesty**

| Variables | Coding | Number of questions | stability | Self-Honesty |
|---|---|---|---|---|
| Technical Dimension | X1 | 5 | 0.784 | 0.614 |
| Organizational Dimension | X2 | 5 | 0.764 | 0.583 |
| Cultural Dimension | X3 | 5 | 0. 804 | 0.646 |
| Smart Hotels | Y | 5 | 0.799 | 0.638 |

It is clear from the table above that the questionnaire form is valid for use according to the results of the Cronbach's alpha coefficient and its property of increasing with the increase in the number of questionnaire paragraphs, as this leads to increased stability. The Cronbach's alpha coefficient for the technical dimension reached (0.784), the organizational dimension (0.764), the cultural dimension (0.804), and smart hotels (0.799). We find that the values of Cronbach's alpha coefficient are high, and they are statistically acceptable in administrative research because their value is greater than (0.50%). The self-reliability of each of them reached, respectively: (0.614), (0.583), (0.646), (0.638).

**Discussion of research hypotheses**:

(1) **Correlation test**:

- **The first main hypothesis**:

$H_0$: There is no significant positive correlation between artificial intelligence and smart hotels.

$H_1$: There is a significant positive correlation between artificial intelligence and smart hotels.

Table No. (6) shows the correlation between the independent variable (artificial intelligence) (X) and the dependent variable (smart hotels) (Y).

**Table (6): Pearson correlation coefficients between the independent variable (X) and the dependent variable (Y)**

| Correlations | | | |
|---|---|---|---|
| | | **X** | **Y** |
| X | Pearson Correlation | 1 | .889** |
| | Sig. (2-tailed) | | .000 |
| Y | Pearson Correlation | . 889** | 1 |
| | Sig. (2-tailed) | .000 | |
| **. Correlation is significant at the 0.01 level (2-tailed). | | | |
| **Relationship type: There is a positive significant correlation between artificial intelligence and smart hotels.** | | | |

The table indicates that the Pearson Correlation coefficient between artificial intelligence (X) and smart hotels (Y) reached a value of (0.889), which is very positive and strong, with a significant significance (Sig = 0.000), which is less than the significance level in the test (α = 0.05), indicating that the relationship is not random, but rather has strong statistical

significance. **This means accepting hypothesis ($H_1$): There is a positive, significant correlation between artificial intelligence and smart hotels**.

As for the tourist interpretation of the table, the more hotels rely on artificial intelligence, the more likely they are to become smart hotels. This reflects the role of advanced technology in improving hotel services and enhancing operational efficiency, as well as the link between the use of artificial intelligence in managing hotel operations, such as: smart reservation systems, robots, virtual assistants, voice and facial recognition technologies, and other services that contribute significantly to enhancing the quality of services provided to guests, in addition to accelerating the digital transformation in tourism, and investing in artificial intelligence that can lead to a faster shift towards smart hotels, making hotels more attractive to tourists looking for comfort and innovation. The strong significance and value of (Sig = 0.000) mean that this relationship is not a coincidence, but rather represents a clear trend in the hotel sector, and indicates that hotels that invest in artificial intelligence will achieve an improvement in performance and services.

▪ **Sub-hypotheses**:

Table No. (7) shows the correlation between the dimensions of the independent variable (artificial intelligence) (X1,X2,X3) and the dependent variable (smart hotels) (Y).

**Table (7): Pearson correlation coefficients between the dimensions of the independent variable (X1,X2,X3) and the dependent variable Y)**

| **Correlations** | | | | | |
|---|---|---|---|---|---|
| | | **Y** | **X1** | **X2** | **X3** |
| Pearson Correlation | Y | 1.000 | .791 | .617 | .834 |
| | X1 | .791 | 1.000 | .521 | .665 |
| | X2 | .617 | .521 | 1.000 | .539 |
| | X3 | .834 | .665 | .539 | 1.000 |
| Sig. (1-tailed) | Y | . | .000 | .003 | .000 |
| | X1 | .000 | . | .002 | .000 |
| | X2 | .003 | .002 | . | .001 |
| | X3 | .000 | .000 | .001 | . |

**Type of relationships:**

**Hypothesis (1): There is a positive significant correlation between technical challenges and smart hotels.**

**Hypothesis (2): There is a positive significant correlation between organizational challenges and smart hotels.**

**Hypothesis (3): There is a positive significant correlation between cultural challenges and smart hotels.**

**Hypothesis (1):**

$H_0$: There is no significant positive correlation between technical challenges and smart hotels.

$H_1$: There is a significant positive correlation between technical challenges and smart hotels.

It is noted in the table that the relationship between the technical dimension (X1) and smart hotels (Y) has a correlation value of (0.791), which is positive and strong, with a significant significance (Sig = 0.000), which is less than the significance level in the test (α = 0.05), and indicates that the relationship is not random, but rather has a strong statistical significance, **which means accepting hypothesis ($H_1$) that there is a significant positive correlation between technical challenges and smart hotels**. The tourism interpretation confirms that the more technical support is available, such as: artificial intelligence systems, robots, and process automation, the greater the chance of success of smart hotels.

**Hypothesis (2):**

$H_0$: There is no significant positive correlation between organizational challenges and smart hotels.

$H_1$: There is a significant positive correlation between organizational challenges and smart hotels.

The table shows that the relationship between the organizational dimension (X2) and smart hotels (Y) has a correlation value of (0.617), which is positive, moderately to strongly, with a significant significance (Sig = 0.003), which is less than the significance level in the test (α = 0.05), and that the relationship has a positive, moderately to strongly statistical significance, **which means accepting hypothesis ($H_1$) that there is a significant positive correlation between organizational challenges and smart hotels**. The tourism interpretation indicates that the organizational structure in hotels affects the success of the transition from traditional hotels to smart hotels, but it is not the most influential factor compared to the other dimensions studied.

**Hypothesis (3):**

$H_0$: There is no significant positive correlation between cultural challenges and smart hotels.

$H_1$: There is a significant positive correlation between cultural challenges and smart hotels.

The table indicates that; the relationship between the cultural dimension (X1) and smart hotels (Y) is associated with a correlation value of (0.834), which is strong with significant significance (Sig = 0.000), which is less than the significance level in the test (α = 0.05), and the relationship is of strong positive statistical significance, **which means accepting hypothesis ($H_1$) that there is a positive significant correlation between cultural challenges and smart hotels**. The tourism explanation for this connection indicates the cultural acceptance of the use of artificial intelligence in hotels, and it greatly affects the shift from traditional hotels to smart hotels, as hotels respect customs and traditions while adopting technology to be more successful in digital transformation, in addition to the culture of workers in accepting this transformation.

(2) **Test of the influence relationship**:

- **The second main hypothesis**:

$H_0$: There is no significant positive influence relationship between artificial intelligence and smart hotels.

$H_1$: There is a significant positive influence relationship between artificial intelligence and smart hotels.

$\hat{y} = \beta_\circ + \beta_1 X$

Where: (Y) smart hotels, and (X) artificial intelligence.

$\hat{y} = 5.983 + 0.419X$

| | | |
|---|---|---|
| t | 26.229 | 5.35 |
| | (0.000) | (0.000) |
| S.E | 0.228 | 0.077 |
| $R^2$ | 0.790 | F= 12.281 |
| | | (0.000) |

It is noted that the F value (12.281) for the simple linear regression model is significant, as the Sig. value reached (0.000), which is less than the significance level (0.050). The R2 value reached (0.790), and the explanation for this is that (79%) of the changes that occur in smart hotels (Y) and the remaining percentage, which is (21%), indicates the presence of other variables. This is interpreted from a touristic perspective as meaning that any change of one unit in the independent dimension (artificial intelligence) (X) will affect the dependent dimension (smart hotels) (Y) by (0.419), which is significant as the Sig. value reached (0.000). As shown by the results; **accepting hypothesis ($H_1$) there is a significant positive influence relationship between artificial intelligence and smart hotels**.

The results indicate that artificial intelligence has a direct and significant impact on the transformation of traditional hotels into smart hotels. In other words, the more hotels increase the contributions of artificial intelligence, such as: the use of robots, smart monitoring systems, artificial intelligence in analyzing the guest experience, the more they will transform into smart hotels.

- **Sub-hypotheses**:

Hypothesis (4):

$H_0$: There is no significant positive influence relationship between technical challenges and smart hotels.

$H_1$: There is a significant positive influence relationship between technical challenges and smart hotels.

$\hat{y} = \beta_\circ + \beta_1 X1$

Where: (Y) smart hotels, and (X1) technical dimension.

$\hat{y} = 5.416 + 0.256X1$

| | | |
|---|---|---|
| t | 46.783 | 5.788 |
| | (0.000) | (0.000) |
| S.E | 0.116 | 0.044 |
| $R^2$ | 0.625 | F= 33.503 |
| (0.000) | | |

It is noted that the F value (33.503) for the simple linear regression model is significant, as the Sig. value reached (0.000), and the R2 value reached (0.625); meaning that (62.5%) of

the changes in the technical dimension (X1) that occur in smart hotels (Y), and the remaining percentage of (37.5%) indicates the presence of other variables. The touristic interpretation of this is that any change of one unit in the technical dimension (X1) will affect the dependent dimension (smart hotels) (Y) by (0.256), which is significant as the Sig. value reached (0.000). According to the results; **accepting hypothesis ($H_1$) there is a significant positive influence relationship between technical challenges and smart hotels**.

The results show that the technical aspect of hotels, such as: smart inspection system, robots, and artificial intelligence in providing services, has the desire to transform hotels into smart hotels, which results in guest satisfaction and advanced services with technological development.

**Hypothesis (5):**

$H_0$: There is no significant positive influence relationship between organizational challenges and smart hotels.

$H_1$: There is a significant positive influence relationship between organizational challenges and smart hotels.

$\hat{y} = \beta_\circ + \beta_1 X2$

Where: (Y) smart hotels, and (X2) organizational dimension.

$\hat{y} = 0.200 + 1.787X2$

t 32.604 2.856
(0.000) (0.006)
S.E 0.134 0.058
$R^2$ 0.380 F= 8.156
(0.006)

The results show that the F value (8.156) is significant, as the Sig. value reached (0.006), which is less than the significance level (0.050). The R2 value reached (0.380), which is a weak percentage; meaning that (38%) of the changes in the organizational dimension (X2) that occur in smart hotels (Y), and the remaining percentage of (62%) is the presence of other variables. This means from a tourism perspective; that any change of one unit in the organizational dimension (X2) will affect the dependent dimension (smart hotels) (Y) by (1.787), which is significant, as the Sig. value is (0.006). Therefore, **accepting the null hypothesis ($H_1$) there is a significant positive influence relationship between organizational challenges and smart hotels**. This means that the organizational aspect of hotels has a weak influence in transforming hotels into smart hotels.

**Hypothesis (6):**

$H_0$: There is no significant positive influence relationship between cultural challenges and smart hotels.

$H_1$: There is a significant positive influence relationship between cultural challenges and smart hotels.

$\hat{y} = \beta_{\circ} + \beta_1 X3$

Where: (Y) smart hotels, and (X3) cultural dimension.

$\hat{y} = 5.273 + 0.132X3$

| | | |
|---|---|---|
| t | 41.257 | 4.111 |
| | (0.000) | (0.000) |
| S.E | 0.128 | 0.032 |

$R^2$ 0.695 F= 16.903

(0.000)

It is clear that the F value (16.903) is significant, as the Sig. value reached (0.000), and the R2 value reached (0.695); meaning that (69.5%) of the changes in the cultural dimension (X3) that occur in smart hotels (Y), and the remaining percentage of (30.5%) indicates the presence of other variables that have an impact. The touristic interpretation of this is that any change of one unit in the cultural dimension (X3) will affect the dependent dimension (smart hotels) (Y) by (0.132), which is significant as the Sig. value reached (0.000). Therefore, **accepting hypothesis ($H_1$) there is a positive significant influence relationship between cultural challenges and smart hotels**.

In the sense of compatibility between the elements of the cultural dimension, such as: cultural values, innovations, and traditions that overlap with technology in the hospitality industry, and dealing with the guest experience, taking into account the cultural aspect of the internal environment of hotels and the lack of resistance of workers to the process of change towards transforming hotels into smart hotels.

It is clear from the above that **the independent variable (artificial intelligence) and its sub-dimensions (technical, organizational, and cultural) have an impact on the dependent variable (smart hotels)**.

**Conclusions**:

1. Artificial intelligence is not just a technical tool, but it is a pivotal element in the future of smart hotels to be a successful sector.
2. Artificial intelligence and its sub-dimensions (technical, organizational, and cultural) have an impact on the dependent variable (smart hotels), as well as the correlation between them.
3. Hotels that include artificial intelligence and digital transformation technologies are more capable of providing guests with a pleasant experience, as this is one of the main factors in improving hotel services and making them more interactive and adaptable to guests.
4. Local culture can contribute to designing hotel services that suit the needs and preferences of guests, and improve the quality of service. Modern hotels have begun to rely heavily on raising the quality of tourism services by adopting technology (artificial intelligence, technical, organizational, and cultural dimensions) in all aspects that overlap with it to form a smart hotel model.
5. Hotels investing in AI will ensure their future success and ability to keep up with their services to meet the needs of guests in the digital age.

**Recommendations**:

Invest in the application of artificial intelligence technologies, and maximize its use in tourist hotels, as these technologies overlap significantly in hotel life areas, such as: data analysis, predicting customer customers, creating unique digital experiences. As well as in improving technical procedures for hotels, such as artificial intelligence systems in monitoring, operations accounting, and new robots in services. The hotel management also developed plans to improve the organizational structure within the hotels, such as: developing a specialized technology department and a specialized information technology department, as the organizational structure has a strong positive impact in transforming traditional hotels in Karbala into smart hotels.

Investing in the internal organization of the digital transformation infrastructure to achieve the greatest effectiveness in applying artificial intelligence and smart technologies within hotels. Developing effective solutions to address the challenges of applying artificial intelligence in the hotels of the holy Karbala Governorate. Artificial intelligence must be part of tourism planning in general, and hotel planning in particular, and changing traditional hotel rooms into luxury smart rooms.

Raising the level of training and awareness among hospitality workers in the holy Karbala Governorate on how to use artificial intelligence to improve the guest experience, support recent changes in hotels, and seek to train employees to adapt to these new changes.

Integrating the local culture in the holy city of Karbala with the design details of the hotels, so that smart hotels are in line with the customs and traditions of the region, as well as spreading cultural awareness among hotel employees about the importance of providing services of various kinds and respecting the integration of local culture to transform traditional hotels into smart hotels.

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