Applicability of Blockchain Technology in Egyptian Hotels

قابلية تطبيق تكنولوجيا Blockchain في الفنادق المصرية

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Article Info	**معلومات المقالة**

Abstract

This research aims to evaluate the Perceptions of Egyptian hotel Managers towards the applicability of blockchain technology using the TAM model. Three approaches were used: descriptive, analytical and explanatory. Field data were collected using a survey form (500 questionnaires) directed to a random sample of department managers and their assistants within a random sample selected from five-star hotels in Greater Cairo (12 hotels) and Sharm El Sheikh (22 hotels). Field data were statistically analyzed using SPSS program. Hotel managers and their assistants have strong positive perceptions towards the adoption of blockchain technology due to its many unique uses, with some natural concerns. The results confirm the need to adopt blockchain technology because it will make a real revolution and radical change in the local and global hospitality sector. This research is one of the first studies that dealt with the adoption and application of this very important new technology "Blockchain" in the Egyptian hospitality sector. It will create a significant competitive advantage for hotels in Egypt.

الملخص

تكنولوجيا Blockchain جديدة سوف تحدث ثورة حقيقية في صناعة الضيافة والسفر في المستقبل القريب. ستخلق ميزة تنافسية كبيرة للقطاع الفندقي، بل وستغير صناعة السياحة كلياً نظرًا لمميزاتها العديدة والفريدة. فوفقاً لتصورات الخبراء والممارسين في صناعة الضيافة ستعمل هذه التكنولوجيا على زيادة ثقة العملاء في صناعة الضيافة بأكملها، وستعيد تشكيل النظام البيئي السياحي المركزي Ecosystem. لذا يمكن القول إنها تقنية واعدة من شأنها أن تغير بيئة الأعمال العالمية سواء في القطاع الحكومي أو الخاص. هذا ولن يقتصر استخدامها على مجال معين، ومن المتوقع أن تُستخدم بشكل تدريجي وموسع في جميع القطاعات، ومن ثم ستؤثر بشكل كبير على طريقة تقديم الخدمات وشكل المعاملات على المدى المتوسط والبعيد. يهدف هذا البحث إلى تقييم انطباعات مدراء الفنادق المصرية حول إمكانية تطبيق تكنولوجيا blockchain باستخدام نموذج TAM. اعتمد البحث على المنهج الوصفي والتحليلي والتفسيري. تم تطبيق الدراسة الميدانية على عينة عشوائية من فنادق الخمس نجوم بمدينتي القاهرة الكبرى وشرم الشيخ. تم استخدام اسلوب الاستقصاء في جمع البيانات الميدانية استاداً لمقياس ليكارت الخماسي ونموذج قبول التكنولوجيا TAM. وجهت استمارات الاستقصاء إلى عينة عشوائية من مدراء الأقسام الفندقية ومساعديهم. من أهم النتائج التي تم التوصل إليها ارتفاع مستوى انطباعات المدراء عن تكنولوجيا البلوك تشين فيما يتعلق بسهولة الاستخدام، وتعدد الفوائد، وكثرة المميزات، بالإضافة إلى قوة الاتجاهات والنوايا السلوكية نحو استخدامها في المستقبل القريب. أوصى البحث بضرورة تبني هذه التكنولوجيا الحديثة داخل الفنادق المصرية نظراً لفوائدها الفريدة.

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Introduction

Blockchain technology will make a real revolution in the hospitality and travel industry in the near future. It will create a great competitive advantage for hotels and it will completely change the tourism industry due to its unique features. According to hospitality experts and practitioners, this technology will increase customer confidence in the entire hospitality industry and will reshape the central tourism ecosystem. Therefore, it can be said that blockchain is a promising technology that will change the global business environment, whether in the governmental or private sectors, and the use of this technology will not be limited to a specific field, but it is expected that its use will gradually expand and will greatly affect the method of providing services and the form of transactions in the medium and long term (Raluca-Florentina, 2022; Barkel et al., 2021).

1. Literature Review

Overview of Blockchain Technology

Blockchain is a global online crypto-based database. It is decentralized and cannot be modified, altered, deleted or hacked. In other words, it is an international open and distributed digital ledger (Nakamoto, 2008). Through it, anyone can carry out any transactions (financial or non-financial), record data, concluding smart contracts, or transfer the ownership of assets from one party to another at the same time without the need for any intermediary (khalifa, 2018). Blockchain transactions can involve a variety of activities, including sending and receiving money, paying for goods and services, making reservations, booking flights or hotels, entering into contracts, and much more (Dogru et al., 2018). This technology allows the provision of services directly from the service provider to the beneficiary of them. It contains an endless list of data records for any transactions. Any transaction that takes place within this technology is called a block, and each block takes a highly complex algorithmic code (hash) and timestamp that distinguishes it from other blocks (Willie, 2019). The blocks are then connected to each other within the technology in the form of encrypted chains. Millions of people participating in Blockchain around the world are observers and witnesses to any transaction that takes place. Thus, Blockchain is currently the largest distributed database globally among individuals (Özgit and Adalier, 2022; Kvakarić, 2022).

In the hospitality industry, if a customer wants to book a room in a particular hotel via blockchain, he will usually first read previous reviews of customers who have stayed in this hotel. Knowing that this technology does not accept any comments or false information (fake transactions). If a customer makes a misleading comment regarding any hotel; This technology does not accept this comment until it has been verified by millions of miners and nodes (users) around the world in a few seconds, in this case, they represent all customers and parties who have already experienced staying and dealing with this hotel. If the miners validate this review through the consensus of nodes, it will be accepted in the form of a new encrypted block and then this new block will be combined into an encrypted chain of hotel reservations data, which cannot be modified, or deleted, or hacked. It is available to all people involved in this technology around the world. Therefore, the reviews will be real, verified, reliable, and from real customers (Raluca-Florentina, 2022; Caddeo and Pinna, 2021).

Origin of Blockchain

Blockchain technology appeared in 2008, after the global financial crisis, and the bankruptcy of a large number of banks, such as the American Lehman Brother Bank. At this time, a general idea spread among the people, that they no longer need banks because they lost confidence in them to take charge of their money and keep their information confidential. In this period, a Japanese cryptologist who borrowed the name Satoshi Nakamoto published a research paper explaining a new decentralized

financial system protected by cryptographic mathematical algorithms, and this system was the beginning of the emergence of the Bitcoin currency (Nakamoto, 2008; Duros, 2018). Blockchain was used at the beginning of its emergence to conduct encrypted financial transactions "Bitcoin" only, then after that it began to develop and enter all organizations, businesses and fields. Bitcoin cannot be counterfeited or double-used and allows its users to anonymize and speed payments. In addition to the lowest transaction cost, this remains constant regardless of the amount transferred (Kumar et al., 2021).

Privacy and Security

This technology is characterized by a high degree of transparency, security, accuracy, and privacy. It is completely different from the well-known traditional databases because all its transactions are carried out through ciphers and codes, and therefore it is difficult to hack. Although there are no intermediaries, supervisory authorities, or regulators for the blockchain, it has a high degree of trust and an advanced level of security due to the mechanism by which it operates. All participants in the Blockchain network are essentially monitors of any transactions made using cryptocurrencies. All transactions are recorded directly on millions of computers around the world, and all data for these transactions is regularly updated every second (Makhdoom et al., 2019). If someone tries to hack the network, falsify coins, or steal the property and assets of others, within one second (the network update period) he is obligated to do two things: First: hack millions of networked computers around the world; Second: Decrypt complex codes and ciphers of data blocks, and chains, in order to erase these data recorded on all computers and phones, or replace it, or create other data of its own, within one second, and this is practically impossible (Dogru et al., 2018; Miraz et al., 2020).

Uses, Applications and Advantages

The uses and applications of the Blockchain are many and varied to include all organizations, transactions, and all aspects of life, such as: transferring and receiving payments; booking hotel rooms; flight reservations; identification; marketing and Advertising of services and products; Recording data; Transfer of file assets and property from one party to another, but the first party does not keep the original copy, as in the case of sending a copy by e-mail; Follow up on the transportation of parcels, cargo, containers, and merchandise; contract registration; Follow-up of the itineraries of vehicles, transportation, aircraft, and ships; conducting government transactions; Follow up of production lines; recording of purchase and sale transactions; follow up customer service; Documenting any transactions (Khalifa, 2018; Fayez, 2020; Khanna et al., 2020).

Blockchain technology eliminates the role of intermediary, it replaces banks in payments; a notary public in the property registry; and traffic departments in the registration of cars; and replaces intermediary companies such as Uber in providing services. Blockchain makes it possible to register any property of all kinds such as real estate, land, cars, personal property or patents; or intellectual property rights such as books; or anything a person would like to register to secure their rights so that they can then sell them via the Blockchain or make transactions on them later. Thus, this technology can be used in the financial economy; energy; health; education; Transportation; construction; investigations, and smart business (Rashideh, 2020; Sharma et al., 2021).

The advantages of the blockchain are numerous, such as eliminating routine; Time-saving; Speed in completing transactions; quality assurance; tackling corruption; Accuracy; decentralization. Stability; Confidence; Transparency; credibility; inability to change or modify the data; No Mediation, Data Security, Identity Protection; Anonymity. Improve the quality and performance of communications; reduce transaction costs; Improve privacy (Rejeb and Rejeb, 2019; Sharma et al., 2021; Filimonau and Naumova, 2020).

Blockchain Components

Blockchain consists of 8 basic components, **Nodes**: which are users and computers connected to the blockchain network around the world; **Transaction**: It is any operation that takes place within this technology; **Block**: It is a set of transactions that are distributed to all nodes; **Chain**: A group of blocks; **Miners**: They are specific nodes (users that are skilled in cryptography) check for any blocks before adding them to the blockchain; **Consensus**: a set of rules for the implementation of blockchain transactions; **Hash**: The digital signature or code of each block and chain within the blockchain; **Timestamp**: It is the time when any transaction was performed within the chain (Sathishkumar, 2021; Khalifa, 2018).

How Does Blockchain Work?

Any transaction within the blockchain is executed within seconds or minutes through the following steps (Kopanaki et al., 2021; Karam El-Din and Habib, 2019; Barkel et al., 2021):

1. **Transaction Request**: A message is sent to the Blockchain network containing all the data and information related to this transaction (financial or non-financial transactions) and a Timestamp that confirms the authenticity of the sender, the transaction address, and the address of the recipient;
2. **Authentication**: Network nodes receive the message about the transaction, validate it by decrypting the digital signature, and put it into a set of pending transactions;
3. **Block Assembly**: A network node collects pending transactions into a single block containing compatible, recurring, shared, and synchronized digital data in a specified period, and then broadcasts this block to the network for final validation;
4. **Mining and Validation**: Network miners receive the proposed blocks for validation by obtaining the correct hash that links these transactions or blocks to previous blocks within the chain;
5. **Consensus**: If there is a consensus of miners on the validity of these transactions, the new block with all its similar transactions is merged into the blockchain and becomes available to millions of users around the world (nodes). These steps can also be illustrated in Figure (1).

Based on the above, blockchain technology operates according to three main mechanisms "Blockchain principles" (Barkel et al., 2021; Dogru et al., 2018; Önder and Gunter, 2022):

1. **Distributed Ledger Technology**: It is a decentralized financial record that includes data of financial, physical, legal, and electronic assets that can be shared across a network of locations, geographic areas, or multiple institutions in a peer-to-peer system, and all participants on the network can view this data and obtain a copy of it. The security and accuracy of the assets stored in the registry is maintained in an encrypted form, and it is very difficult to identify the identity of users because all names, data and operations are carried out through ciphers and codes;
2. **Decentralized Database:** This mechanism aims to eliminate the idea of centralization, where there is no one party, one server, one device or one computer that controls the block chain, but the chain is distributed among all the individuals participating in it around the world, where anyone in the world can download the chain, view it and participate in it;
3. **Mining**: Miners around the world perform a set of complex arithmetic operations through their computers in order to reach the correct code or hash that connects any transaction to the previous transaction within the chain, and distinguishes it from other transactions. This is the main function of the mining process. Once the correct hash is obtained, the transaction is authenticated and allowed to join other processes within the blocks, eventually forming the block chain. This makes the process of hacking or manipulating the system very difficult. Knowing that the miner who reached the correct hash wins a percentage of the conversion process in the form of Bitcoin

**Figure (1):** How Does Blockchain Technology Work?
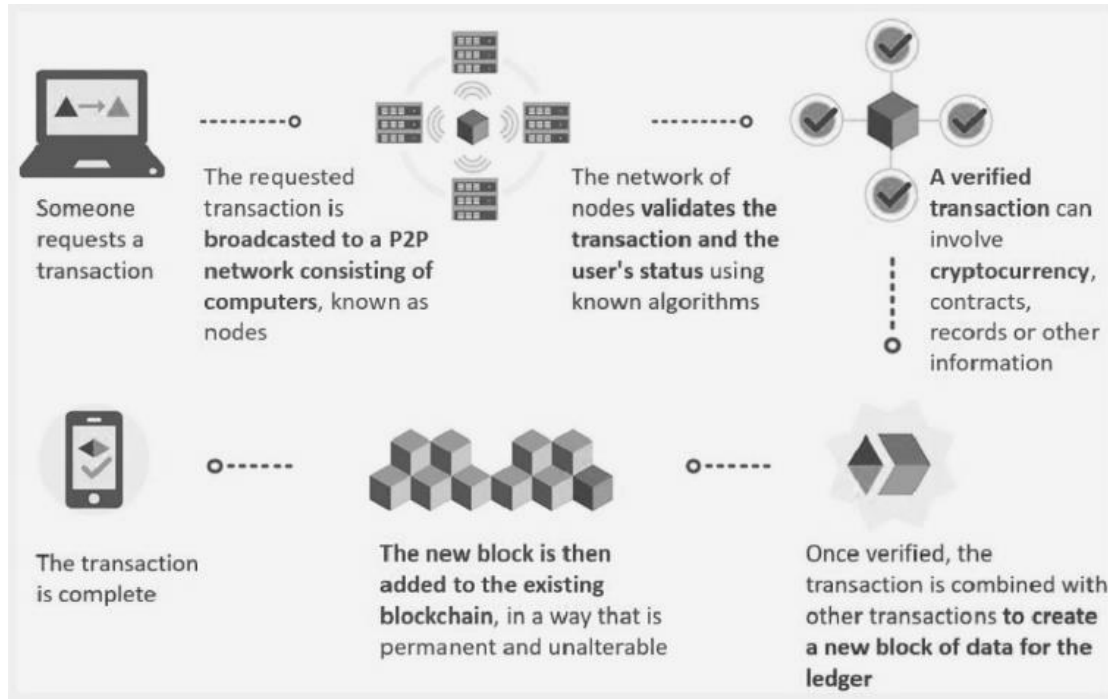
Source: Ahamad et al., (2022)

Blockchain Uses in Hospitality Industry

There are many unique uses of the blockchain in the hospitality industry such as: identification; market orientation; eliminate overbooking problems; Transparency and security in transactions; facilitate payments; Verification and reliability in reviews; customer tracking; supply chain control; improve loyalty programs; conclusion of smart contracts; eliminate mediation; tracking lost bags; direct bookings; Effective inventory management; Online content update (Rashideh, 2020; Erceg et al., 2020). These uses are shown in Figure (2).

Figure (2): Blockchain Uses in Hospitality Industry
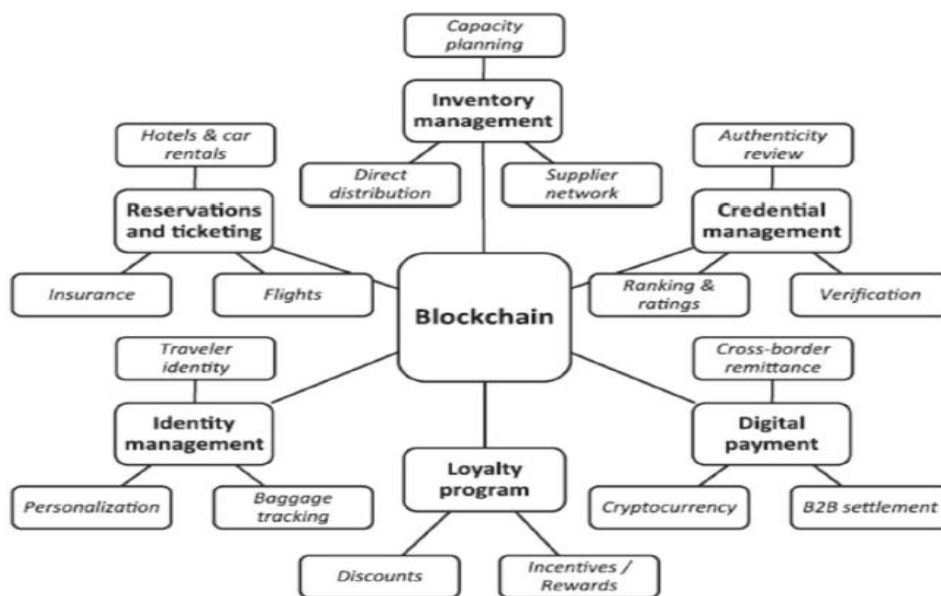
Source: Erceg et al., (2020)

The Following is an Explanation of The Most Important Uses and Advantages of Blockchain Technology in The Hospitality Industry:

Facilitating Customer Identification (Digital ID): Blockchain facilitates accurate identification of customers. Once this technology is applied, customers will not face any trouble in identifying their identities and will not have to present them when booking flights or hotels, travel permits, entering airports or registering in hotels. Blockchain allows identities to be registered in the biometric system (fingerprint system), thus eliminating the need for paper identities. Also, through the digital identity provided by the blockchain, the problems of theft and forgery of identities and important personal data can be eliminated, whether in airports, restaurants, hotels or anywhere else. Also, through this technology, birth certificates, passports, driver's licenses, or any important personal papers can be registered. Thus, this technology helps to identify the identities of people through certain codes controlled by the customer himself, and through this technology, the authorities can track any traveler (Sathishkumar, 2021).

Market Orientation: Through blockchain, customers can securely save their favorite leisure activities, culinary preferences, and travel preferences. As well as sharing their journey experiences through reviews of restaurants, accommodations, and entertainment. This technology updates hotels with the changing needs and desires of customers accurately and reliably. Also, through it, it is possible to identify the strengths and weaknesses of competitors, and then improve the quality of services and increase competitiveness (Khanna et al., 2020; Raluca-Florentina, 2022).

Avoiding Duplicate Bookings: Since Blockchain technology has been implemented, duplicate bookings are now impossible and a thing of the past. During the holiday and vacation seasons, when there is a high demand for centralized payment methods, the issue of duplicate bookings or overbooking is particularly relevant. Multiple reservations for the same entity are one way that the centralization problem can show up. The decentralized nature of blockchain, which prohibits any form of denial of service or single point of failure, is one of its primary features (Khanna et al., 2020; Filimonau and Naumova, 2020).

Transparency and Security in Transactions: By using cryptocurrencies, blockchain makes it possible to conduct financial operations or transactions. The usage of cryptocurrencies guarantees the security and traceability of a transaction. The adoption of cryptocurrency also reduces the risk of dealing with counterfeit money (Rashideh, 2020; Khanna et al., 2020; Dogru et al., 2018).

Verification and Authenticity in Reviews: The best method to evaluate the quality of hotel services is through customer reviews, which must be reliable and verified. Therefore, false, misleading, and abusive reviews represent one of the biggest challenges facing either hotels or even customers. But the use of the blockchain completely eliminates any false reviews, whether by customers, hotels, or tourism and travel agencies. With the blockchain, there is no false data. All information, reviews, and prices are transparent, true, accurate, and with a high degree of confidence; It is even available to the whole world, and it cannot be deleted, changed, or hacked. Therefore, the reviews will be real and honest from real customers (Önder and Treiblmaier, 2018; Rejeb and Rejeb, 2019).

Tracking of Incoming Customers: This technology enables hotels to track in real-time the customers who have booked rooms from the moment they leave the house, arrive at the airport, and take off their flight until they arrive at the hotel. This leads to increased accuracy, efficiency, and speed in the registration processes, preventing waiting, and thus increasing customer satisfaction and loyalty. Also, tracking customers is only done through the information they share with the hotel on the blockchain of their own volition, thus preserving the privacy of customers (Dogru et al., 2018; Sathishkumar, 2021).

Monitoring and Tracking of Food Supply Chains: The quality of supply chain management systems can be improved through blockchain. The blockchain enables restaurants and hotels to easily and accurately monitor and track food supply chain systems, starting from the farm to the final consumer, through a barcode labeled on food products that record all the stages the food has gone through and was recorded on the blockchain. Thus, ensuring the quality and safety of foods. Through this technology, hotels can deal with trusted food suppliers, as well as customers can check and see the source of the foods they eat and thus increasing their confidence and satisfaction with the quality of the foods. In other words, the blockchain helps to implement the HACCP system accurately. In addition, in the case of confirming the spread of a certain disease or the occurrence of poisoning due to a specific food, it is possible through the blockchain to track and withdraw this food within seconds (Caddeo and Pinna, 2021; Willie, 2019).

Improving Loyalty Programs: Blockchain enables hotels and airlines to improve their loyalty programs by offering rewards to their customers in the form of loyalty points and tokens. This technology helps hotel organizations to identify all the needs, desires, and preferences of customers accurately and immediately and then provide them with what satisfies them and ensures their loyalty. Hotels offer loyalty points to their loyal customers; And for those who always write positive reviews about the hotel and its services; As well as for those who recommend others to stay in the hotel; And also, for those who participate in improving the quality of services. Through this technology, customers can freely sell, buy and exchange their loyalty points with others. Loyalty points and tokens increase competition between hotels to improve the quality of services to attract more customers. Customers can also use their loyalty points and tokens at restaurants, airlines, and other organizations (Barkel et al., 2021).

Concluding Smart Contracts: Through the blockchain, accurate, documented, secure and fast smart contracts can be concluded between hotels, tourism companies, travel agencies, tour operators, as well as suppliers of any services or products such as food suppliers. Franchise contracts and management contracts can also be concluded between hotels and management companies. Also, the hotel check-in process can be completely eliminated by concluding accommodation contracts with customers, allocating rooms for them, and issuing digital keys once the payment is completed. These smart contracts have legal status and contractual terms similar to well-known traditional contracts. Once a contract is concluded in any transaction, it is immediately recorded on the blockchain and then enters into force, and any payments can also be made immediately or any operations or tasks performed based on the contractual terms. These smart contracts facilitate payments, facilitate sales of hotel rooms, and improve the quality of transactions between hotels and other parties such as travel and tourism agencies (Filimonau and Naumova, 2020; Willie, 2019).

Elimination of Intermediaries: With the use of this technology, customers will not have to book through tourist intermediaries, the reservation will be direct with the hotel, and hotels will not become a victim controlled by tourism and travel agencies. Hotels will not rely too heavily on any tourist intermediaries. Tourism and travel agencies cannot exaggerate the prices of flights, hotels and entertainment programs; It cannot provide misleading information about hotels or destinations. It cannot also pressure or slander hotels or customers. This technology also eliminates or marginalizes the role of banks because dealing is directly with Bitcoin, and thus reduces expenses (Barkel et al., 2021).

Tracking Lost Baggage: Despite the great developments made by airlines in dealing with customers' bags, customers still face many difficulties due to lost bags, and then a lot of time, effort and money is lost, both for customers and airlines. But with the adoption of the blockchain, the location and status of lost bags can be tracked with ease and accuracy until they reach their owners at the hotel or

anywhere, through a code that is attached to the baggage and is constantly scanned (Önder and Treiblmaier, 2018; Barkel et al., 2021; Caddeo and Pinna, 2021).

Ticketing and Reservations: This technology facilitates accurate and easy reservation and ticket issuance, and eliminates the black market for tickets and speculation in their prices. In addition, hotels constantly update delayed or canceled flights. There will be transparency in the prices of reservations and tickets. This technology completely solves the problems of losing airline tickets (Raluca-Florentina, 2022**).**

Facilitating Payments: blockchain facilitates all kinds of local and international payments between hotels, customers and other companies. It replaces traditional methods such as credit cards, banks and money exchange companies. Payment is made using cryptocurrency "Bitcoin". Bitcoin payment will create a strong competitive advantage in the market, and it will be more secure and trackable. Knowing that the global hotel industry in 2018 generated 8.81 trillion us dollars from the global economy, and therefore it is possible to imagine the amount of money obtained by the parties and intermediary companies in the form of commissions and fees, which can be saved through the blockchain (Sathishkumar, 2021).

Marketing and Advertising: With the adoption of blockchain, there is no need any more to contract with hundreds of marketing and advertising companies, each of which has its own rules and prices, and thus hotels can offer, advertise and market their services without the great need for traditional intermediaries (Sharma et al., 2021; Rashideh, 2020).

Ensuring Compliance with Tax Laws: This technology will enable hotels to ensure compliance with tax regulations by accurately tracking and calculating owed taxes, and taxes can be paid through smart contracts (NTT DATA, 2019).

Effective Inventory Management: Inventory management in the hospitality industry is a major challenge. But through the blockchain, hotels can manage their inventory effectively and easily, such as announcing the number of rooms available, the size of the food and beverage inventory, or the number of seats on an airplane. Inventory management through this technology reduces costs, especially as it eliminates the traditional mediators who control the process of inventory management in the tourism industry (Dogru et al., 2018; Sathishkumar, 2021).

Updating Online Content: The continuous, timely update of the content of hotels' websites is extremely important due to the importance of informing customers of everything new and so that they have the correct and complete information first-hand. Through this technology, hotels can update their content with ease and accuracy such as brand changes; any updates in the types and methods of service; Any new facilities or videos (Raluca-Florentina, 2022).

Facilitating Cooperation with Security Authorities: Blockchain facilitates cooperation between hotels and security authorities regarding any required papers, passports, documents or reports and helps maintain borders and public security and prevent crimes and illegal immigration through the digital identity stored on the blockchain (NTT DATA, 2019).

2. Research Aim
This research aims to evaluate the Perceptions of Egyptian hotel Managers towards the applicability of blockchain technology using TAM model.

Research Model

This research was based on the technology acceptance model "TAM", which was presented by Davis in 1989. This model assumed that the user's acceptance of any modern technology depends on two main factors: the expected ease of use, meaning the extent to which the user believes that his use of modern technology will not cost him any kind of effort or hardship, and the expected benefit, meaning the extent to which the user believes that the application of this modern technology will benefit him. These two factors influence a third dependent factor, which is the behavioral intention to use. Meaning the actual willingness to use this technology if it is applied. That is, the more modern technology from the user's point of view is easy to use and useful, the more there is a real behavioral tendency and intention to use it if it is applied. Thus, the TAM model is considered a powerful indicator by which users can predict the behavior of users towards modern technologies before they are applied. In this context, the researcher added a fourth factor to this model, which he considers to be no less important than the other factors, which is the expected fears, meaning that the fewer the fears expected from modern technologies, the greater the expected benefits from them and the behavioral intention to use them, as shown in Figure (3).

Figure (3): Structural Model of the Research
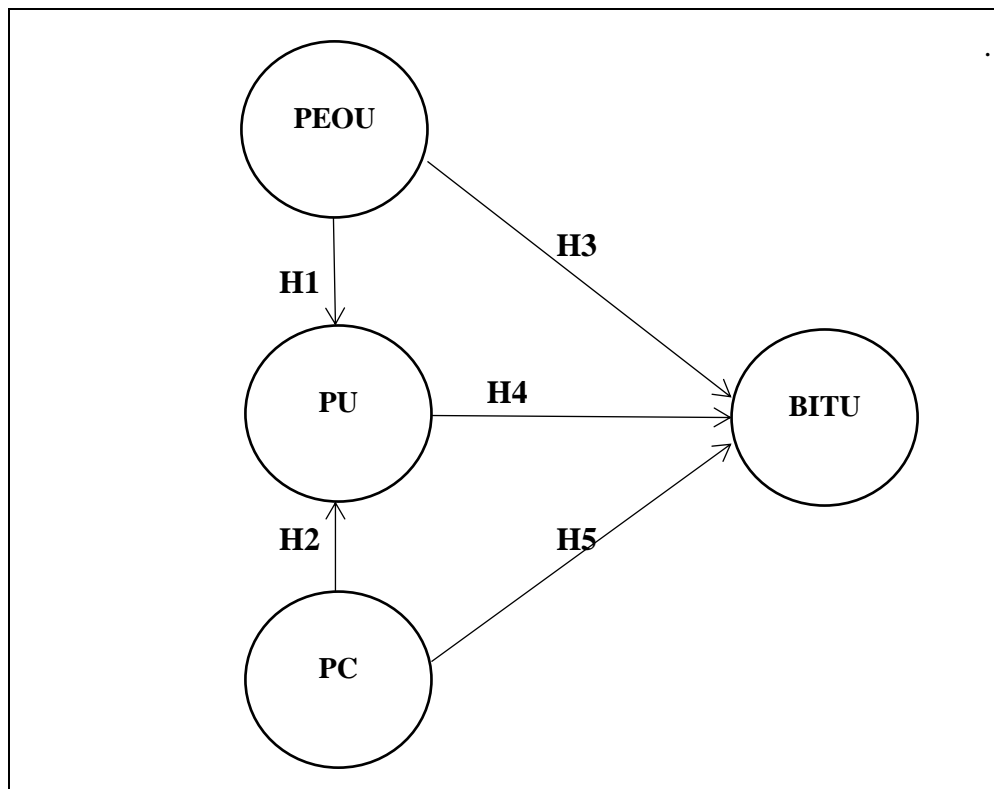
PEOU: Perceived Ease of Use; **PU**: Perceived Usefulness; **PC**: Perceived Concerns; **BITU**: Behavioral Intention to Use.

3. Research Hypotheses

H1: There is a positive, statistically significant correlation between the perceived ease of use of the blockchain and its perceived usefulness.

H2: There is a negative, statistically significant correlation between the perceived concerns of the blockchain and its perceived usefulness.

H3: There is a positive statistically significant correlation between the perceived ease of use of the blockchain and the behavioral intention to use it.

H4: There is a positive, statistically significant correlation between the perceived usefulness of the blockchain and the behavioral intention to use it.

H5: There is a negative, statistically significant correlation between the perceived concerns of the blockchain and the behavioral intention to use it.

4. Research Methodology

This research included three main approaches: descriptive, analytical, and explanatory. As for the data collection method, the research relied on the survey method in collecting field data based on the Likert five-scale, where a survey form consisting of four main parts was designed based on the TAM model. The first part aimed to evaluate managers' perceptions of the perceived ease of use of blockchain technology. The second part aimed to evaluate managers' perceptions of the expected concerns from the application and use of blockchain technology. The third part aimed to evaluate the perceptions of managers towards the perceived usefulness of the application of blockchain technology. Finally, the fourth part aimed at evaluating the behavioral tendencies of managers and their assistants towards the use of blockchain technology in the case of its application in Egyptian hotels.

As for the research community, it was five-star hotels in Greater Cairo and Sharm El Sheikh. The study sample consisted of 22 hotels and resorts in Sharm El Sheikh and 12 hotels in Greater Cairo that were randomly selected. The questionnaire was directed to a random sample of managers, assistants and supervisors in different departments. The total number of distributed questionnaires was 500, while the number of valid forms for analysis was 405, with a response rate of 81%. Field data were statistically analyzed using spss software. As for statistical methods and measures: some statistical methods were relied upon in analyzing field data, such as: Cronbach's alpha coefficient to verify the stability of the scale, the regression coefficient and simple linear correlation to analyze the model relationships, in addition to the descriptive analysis using the mean and standard deviations according to the Likert five-scale.

5. Results And Discussion
Reliability Analysis

It is clear from Table (1) that the values of Cronbach's alpha correlation coefficient for the four variables ranged from 0.83 to 0.96 All of these values are greater than the statistically acceptable minimum of 6., and therefore it is an important indicator of the stability of this scale and the existence of internal consistency between all its dimensions and items.

Table (1): Cronbach's Alpha Correlation Coefficient

Variables	Number of Items	Cronbach's Alpha Coefficient (A)
Perceived Ease of Use "PEOU"	14	0.87
Perceived Concerns "Pc"	7	0.92
Perceived Usefulness "PU"	19	0.96
Behavioral Intention to Use "BITU"	10	0.83

Descriptive Analysis

Perceived Ease of Use "PEOU"

The results of Table (2) indicate that hotel managers have strong positive perceptions towards the expected ease of use of the Blockchain technology, where the mean values ranged from 3.44 to 4.89, and they all fall in the fourth and fifth range corresponding to the direction of approval (agree and very agree) on the five-point Likert scale. As for the standard deviation values, they all indicate an acceptable variance and homogeneity in the responses of the sample members to this dimension, as the standard deviation did not reach the zero value 0.00, which indicates complete congruence in the answers. Also, its value did not exceed 1.5, indicating the absence of a large dispersion in the answers of the sample and a clear deviation from its mean.

Table (2): Hotel Managers' Perceptions Towards the Perceived Ease of Use of The Blockchain

S	Perceived Ease of Use "PEOU"	Mean	Standard Deviation
1	Payments	4.89	0.96
2	Identification (Digital ID)	4.00	0.91
3	Market orientation	4.32	0.88
4	Direct bookings	4.55	0.92
5	Verification of reviews	3.88	0.90
6	Tracking incoming customers	3.75	1.12
7	Monitoring food supply chains	4.21	0.94
8	Concluding smart contracts	4.65	0.87
9	Tracking lost baggage	4.27	1.00
10	Ticketing	3.89	1.05
11	Advertising and marketing	4.80	0.86
12	Managing inventory effectively	3.44	0.81
13	Updating online content	3.82	0.99
14	Cooperation with security authorities	3.91	1.22

Thus, hotel managers perceived that blockchain is easy to use and apply in many hotel operations such as ease of verification of identities, market orientation, direct reservations, checking reviews, tracking customers, monitoring food supply chains, conducting smart contracts, tracking lost baggage, payments, etc. In addition to ticketing, effective inventory management, marketing, and advertising. This is indicated by previous studies (Barkel et al., 2021; Raluca-Florentina, 2022; Rashideh, 2020), This is indicated by previous studies (Barkel et al., 2021; Raluca-Florentina, 2022; Rashideh, 2020), which confirmed that blockchain has many unique uses in the hospitality industry.

Perceived Concerns "PC"

The results of Table (3) indicate that hotel managers have concerns about this technology. As all the answers of the sample fell within the range of neutrality and agreement. This confirms the managers' fear of this technique. But it should be noted here that it is natural for some to have fears of any new and unfamiliar technologies. Despite these natural fears of this technology, it has many advantages and benefits in the hospitality industry and other sectors. The evidence is that there are now many hotels and hospitality organizations in the world applying this technology.

Table (3): Hotel Managers' Perceptions Towards the Perceived Concerns of Blockchain

S	Perceived Concerns "PC"	Mean	Standard Deviation
1	Economic concerns	3.51	0.88

2	Security concerns	3.00	0.90
3	Legal concerns	2.98	0.93
4	Social concerns	3.54	0.85
5	Technical concerns	4.01	1.02
6	Privacy concerns	3.77	0.91
7	Confidence and stability concerns	2.65	0.89

The results of Table (3) are consistent with previous studies (Sharma et al., 2021; Khalifa, 2018) which showed that there are some concerns that naturally face the application and adoption of any new technologies such as Blockchain. These concerns may relate to any economic, technical, privacy or legal aspects.

Perceived Usefulness "PU"

The results of Table (4) showed the high level of managers' perceptions towards the expected benefits and advantages of applying Blockchain technology in Egyptian hotels. All mean values of these perceptions fell in the fourth and fifth range, corresponding to the direction of agreement (agree and very agree) on the Likert five-scale.

Table (4): Hotel Managers' Perceptions Towards the Perceived Usefulness of Blockchain

S	Perceived usefulness "PU"	Mean	Std. Deviation
1	Eliminating routine	3.91	0.93
2	Time-saving	3.55	0.95
3	Speed in completing transactions	4.02	1.03
4	Quality assurance	4.00	0.86
5	Tackling corruption	3.89	0.89
6	Accuracy	4.55	0.95
7	Decentralization	3.77	0.90
8	Stability	3.95	0.82
9	Confidence	4.33	0.96
10	Transparency	4.80	0.87
11	Credibility	4.11	1.00
12	Eliminating mediation	4.00	0.90
13	Data security	4.54	0.89
14	Identity protection	3.96	0.93
15	Reduce transaction costs	3.63	1.12
16	Improve privacy	4.15	0.91
17	Impenetrable	3.95	0.89
18	Documentation of transactions	3.90	0.87
19	Improving loyalty programs	3.78	1.00

The results of the table (4) agree with the results of previous studies (Sathishkumar, 2021; Filimonau and Naumova, 2020; Dogru et al., 2018), which clarified the many benefits and advantages of the blockchain in general in the various sectors and in particular in the hospitality industry, such as: eliminating routine, time-saving, speed in transactions, quality assurance, tacking corruption, accuracy, decentralization, stability, transparency, data security, identity protection, reduce transaction costs, improve privacy, impenetrable, documentation of transactions, and improving loyalty programs.

Behavioral Intention to Use "BITU"

Table (5) shows strong behavioral intentions by hotel managers towards the use of blockchain technology, where all mean values are in the fourth and fifth range corresponding to the direction of approval (agree and very agree) on the Likert five-scale.

**Table (5):** Behavioral Intentions of Hotel Managers Towards the Use of Blockchain

S	Perceived usefulness "PU"	Mean	Std. Deviation
1	Blockchain can be used if it facilitates payments	4.11	0.90
2	Ease of identity verification encourages the use of blockchain	3.88	0.84
3	Accuracy in market orientation encourages us to use this technology	3.67	1.11
4	Preventing overbooking makes us adopt this technology	3.98	1.00
5	Authentication and reliability of reviews encourage the use	4.13	0.99
6	Easy customer tracking encourages usage	4.00	0.89
7	Blockchain can be adopted if it facilitates the monitoring of supply chains	3.66	0.97
8	The conclusion of smart contracts encourages the adoption of this technology	3.94	0.92
9	Speed, accuracy, and safety are factors that encourage the adoption of this technology	3.44	0.85
10	Transparency, stability, and confidentiality are encouraging factors for the use of this technology	4.02	0.97

Through the results of Table (5) we can conclude that the advantages and benefits of the Blockchain encourage hotel managers to adopt it in the near future. This was confirmed by Davis's TAM technology acceptance model in 1989. That is, the more modern technology from the user's point of view is easy to use and useful, the more there is a real behavioral tendency and intention to use it if it is applied.

Model Analysis

A statistical analysis of the research model was carried out using some statistical methods such as the simple correlation coefficient and the simple linear regression coefficient to verify the significance of the relationships contained in the research model, and to identify the strength and quality of these relationships, and the effect of the effect between the different model variables. The results were as shown in the figure (4).

Figure (4): Statistical Analysis of The Research Model
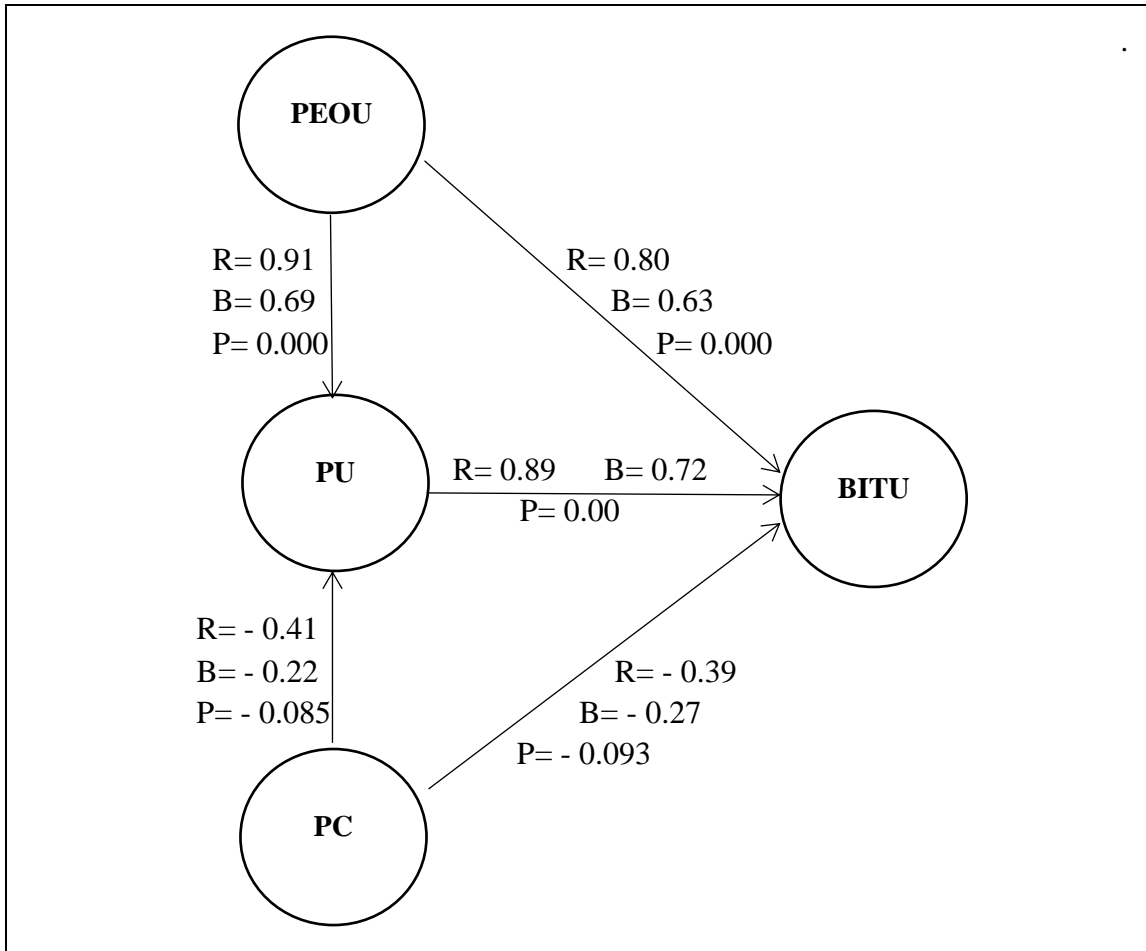
R: Simple linear correlation coefficient, **B**: Simple linear regression coefficient,

P: P-value (Sig) Statistical significance

Hypothesis Test

The First Hypothesis

The results of Table (6) showed that the validity of the first hypothesis of the research model, which states, "there is a direct statistically significant relationship between the perceived ease of use of blockchain technology and the perceived usefulness from it."

Table (6): The Effect of The Perceived Ease of Use of The Blockchain on The Perceived Usefulness of it

Independent variable	Dependent variable: the perceived usefulness			
The perceived ease of use	R	B	T	Sig
	0.91	0.69	7.55	0.000

The results of table (6) are as follows:

- The simple correlation coefficient was 0.91, which means that the relationship between these two variables is a direct relationship with a strength of 0.91 at a level of significance less than 0.05. This means that the more hotel managers perceive the ease of use of blockchain technology, the more they perceive the perceived benefits of it.
- The simple regression coefficient was 0.69, which means that increasing the independent variable (perceived ease of use) by one unit, will lead to a direct change in the dependent

variable (perceived benefits) by 0.69 units. The positive regression coefficient sign also confirms that the relationship between these two variables is a direct causal relationship.

- The value of T was 7.55, which is significant at a level of significance less than 0.05, and this also confirms the validity of the first hypothesis.

The Second Hypothesis

Table (7) shows that the second hypothesis was not confirmed, which states that "there is a statistically significant inverse correlation between the perceived concerns of blockchain technology and the perceived usefulness of it."

Table (7): The Impact of The Perceived Concerns of Blockchain on The Perceived Usefulness of it

Independent variable	Dependent variable: the perceived usefulness			
The perceived concerns	R	B	T	Sig
	- 0.41	- 0.22	- 1.90	0.085

Table (7) shows the weakness of the statistical significance of this relationship due to the decrease in its statistical indicators as follows: the weakness of the simple correlation coefficient (- 0.41), the weakness of the regression coefficient (- 0.22), the low value of T (-1.90) and its insignificance (0.085) because it is greater than 0.05. Consequently, the validity of the second hypothesis was not confirmed, due to the hotel managers' fears about this new technology. Nor is it necessarily that a reduction in perceived fears of blockchain technology inevitably leads to an increase in the perceived benefits of it.

The Third Hypothesis

Table (8) shows the confirmation of the third hypothesis of the research model, which states that "there is a direct statistically significant relationship between the perceived ease of use of blockchain technology as an independent variable and the behavioral intention to use it as a dependent variable." Where the simple correlation coefficient between these two variables was 0.80, which is a strong positive correlation because it approached the correct one (R = -1:1) at a level of significance less than .050. This means that the relationship between these two variables is a direct relationship with a strength of 0.80. Meaning that the more hotel managers' perceptions of the ease of using blockchain technology, the more their attitudes and behavioral intentions towards using it in the future.

Table (8): The Effect of The Perceived Ease of Use of The Blockchain on The Behavioral Intention to Use it

Independent variable	Dependent variable: the behavioral intention to use			
The perceived ease of use	R	B	T	Sig
	0.80	0.63	9.81	0.000

It also appears from Table (8) that the simple regression coefficient "B" between these two variables was 0.63, This means that the increase of the independent variable (perceived ease of use) by one unit; It will lead to a direct change in the dependent variable (the behavioral intention to use) by 0.63 units. The positive sign of the regression coefficient (B = 0.63) indicates that the relationship between these two variables is a direct causal relationship (on the basis that every regression is a correlation and not every correlation is a regression). The value of T was 9.81, which is significant at a level less than .050 (as the value of T is significant if its value reaches ≤ 2), and this also confirms the validity of the third hypothesis of the research model.

The Fourth Hypothesis

The statistical indicators contained in Table (9) clarified the confirmation of the fourth hypothesis of the research model, which states that "there is a direct statistically significant relationship between the perceived usefulness of the blockchain and the behavioral intention to use it."

Table (9): The Effect of The Perceived Usefulness of Blockchain on The Behavioral Intention to Use it

Independent Variable	Dependent variable: the behavioral intention to use			
The Perceived Usefulness	R	B	T	Sig
	0.89	0.72	20.75	0.000

Table (9) shows the following:

- The simple correlation coefficient reached 0.89, This means that the relationship between these two variables is a direct relationship of 0.89 strength at a level of significance less than 0.05. that is, the higher the managers' perceptions of the benefits of blockchain technology, the greater their attitudes and behavioral intentions towards using it.
- The simple regression coefficient reached 0.72, This means that increasing the independent variable (perceived usefulness) by one unit will lead to a direct change in the dependent variable (behavioral intention to use) by 0.72 units. The positive regression coefficient sign also confirms that the relationship between these two variables is a direct causal relationship.
- The value of T was 20.75, which is significant at a level of significance less than 0.05, and this also confirms the validity of the fourth hypothesis of the research model.

The Fifth Hypothesis

Table (10) shows that the fifth hypothesis has not been confirmed, which states that "there is a statistically significant inverse relationship between the perceived fear of blockchain technology and the behavioral intention to use it."

Table (10): The Impact of The Perceived Concerns of Blockchain on The Behavioral Intention to Use it

Independent Variable	Dependent Variable: the behavioral intention to use			
The Perceived Concerns	R	B	T	Sig
	- 0.39	- 0.27	- 1.88	0.093

Table (10) shows the weakness of the statistical significance of this relationship due to the decrease in its statistical indicators as follows: the weakness of the simple correlation coefficient (- 0.39), the weakness of the regression coefficient (- 0.27), the low value of T (-1.88) and its insignificance (0.093) because it is greater than 0.05. Consequently, the validity of the fifth hypothesis was not confirmed, due to the hotel managers' fears about this new technology.

6. Conclusion And Recommendations

Blockchain is a financial and administrative technology system capable of performing several real functions and saving a lot of time, effort, and cost, with the ability to monitor all operations and verify their source in addition to addressing fraud, forgery, manipulation, and tampering as a result of the encryption or hash mechanism. Hotels, travel agencies, airlines, restaurants, and other hospitality firms could enhance their service quality, customer loyalty, and profitability by implementing blockchain technology. All parties involved in the hospitality industry will profit from the adoption of this technology. Therefore, this research recommends that Egyptian hotels and the entire hospitality sector to adopt and apply blockchain technology for its many unique benefits such as accuracy,

reliability, stability, transparency, speed, confidentiality, quality, decentralization, and privacy. In addition to holding awareness and training programs on the use of this new technology.

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