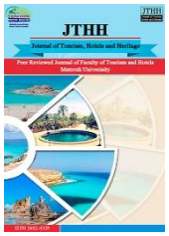

Journal of Tourism, Hotels and Heritage (JTHH)
Journal Homepage: https://sjs.journals.ekb.eg
Print ISSN: 2682-4329
Online ISSN: 2735-3044

Examining the Impact of Artificial intelligence on Hotel Employees: The Case of Egypt

دراسة تأثير الذكاء الاصطناعي على موظفي الفنادق: حالة مصر

Ibrahim Rhoma Gab-Allah*

Article Info **معلومات المقالة**

Article Language: English **لغة المقالة:** الإنجليزية

Vol. 7 No. 2, (2023) pp. 72-87 | https://doi.org/10.21608/SIS.2024.260189.1164

Abstract

Artificial Intelligence (AI) is probably the topic of the hour. This study aims to explore the influence of AI on the hospitality employees' job security in Egypt. AI influence has been a highly debated topic. Previous literature have found different employees' views about AI and its effects on their jobs. On one side, AI as a colleague, on the other side, it is a threating tool to their jobs. In this study, an online questionnaire was used to gather employees' views about AI. Pearson correlation coefficient was used to analyze the relationships between the study variables. In general, there was no significant relationship between AI applications and job security and engagement. However, there were relationships between some of the dimensions of AI applications and dependent variables. Therefore, it is recommended that hospitality practitioners along with the government invest in strong AI infrastructure as it is the trend nowadays. Along with that there should be more focus on training and assurance for employees about AI. AI curriculums should get more attention in Egyptian universities.

الملخص

الذكاء الاصطناعي (AI) ربما يكون حديث الساعة. تهدف هذه الدراسة إلى استكشاف تأثير الذكاء الاصطناعي على الأمن الوظيفي لموظفي الضيافة في مصر. لقد كان تأثير الذكاء الاصطناعي موضوعًا محل نقاش كبير. لقد وجدت الأدبيات السابقة وجهات نظر مختلفة للموظفين حول الذكاء الاصطناعي وتأثيراته على وظائفهم. من ناحية، الذكاء الاصطناعي كزميل، ومن ناحية أخرى، فهو أداة تهديد لوظائفهم. في هذه الدراسة، تم استخدام استبيان عبر الإنترنت لجمع آراء الموظفين حول الذكاء الاصطناعي. وتم استخدام معامل ارتباط بيرسون لتحليل العلاقات بين متغيرات الدراسة. وبشكل عام، لم تكن هناك علاقة ذات دلالة إحصائية بين تطبيقات الذكاء الاصطناعي والأمن الوظيفي والمشاركة. ومع ذلك، كانت هناك علاقات بين بعض أبعاد تطبيقات الذكاء الاصطناعي والمتغيرات التابعة. لذلك، يوصى بأن يستثمر أهل صناعة الضيافة جنبًا إلى جنب مع الحكومة في البنية التحتية القوية للذكاء الاصطناعي لأنه هو الاتجاه السائد في الوقت الحاضر. إضافة إلى ذلك، يجب أن يكون هناك المزيد من التركيز على التدريب والضمان للموظفين حول الذكاء الاصطناعي. كما يجب أن تحظى مناهج الذكاء الاصطناعي بمزيد من الاهتمام في الجامعات المصرية.

Keywords: Artificial intelligence; job security; job engagement; Egypt.

الكلمات الدالة: الذكاء الاصطناعي؛ الأمان الوظيفي؛ المشاركة الوظيفية؛ مصر.

* Demonstrator, Hotel Management Department, Faculty of Tourism and Hotels, Matrouh University.

1. Introduction

Artificial Intelligence (AI) is probably the most up-and-coming technology currently in development which has various potential applications across many fields and industries. While it offers the possibility to increase productivity and create new jobs, it may also replace humans to reduce costs and potentially lead to reduced labor share, increased inequality, and disruptions in many industries (Alekseeva, Azar, Giné, Samila, & Taska, 2021).

Nowadays, artificial intelligence is considered as a reliable tool. Through the increased data volumes, also called Big Data, the advanced algorithms and the supercomputing systems. The concept of AI makes possible for machines to think and learn from experiences, to adjust to new feedback and to perform human tasks through the process of vast amount of data and the detection of pattern (Bounatirou & Lim, 2020).

Furthermore, AI has been widely applied in the hospitality industry to optimize operations and enhance customer experience. According to Al-shami, Al Mamun, Ahmed, and Rashid (2021), The impact of AI can be seen in three main areas, namely, service effectiveness, service efficiency and improved market share. AI technologies facilitate the effectiveness of trip management and implementation by providing information on tourist site, including popular places, food and cultures.

At the same time, the current work environment in the hotel industry is unsure due to technological changes, which is unable to assure the job security of all employees. In this context, Koo, Curtis, and Ryan (2021) provided a study that shows empirical evidence indicating the effect of AI technologies on hotel employees by identifying the significant role of job insecurity and job engagement.

Consequently, artificial intelligence has become a threat to employees' job security. The employees may not be fully engaged in the job and present emotionally and cognitively knowing that they could be replaced by an artificial intelligence application, especially in some specific jobs.

Moreover, in previous literature, Touni and Magdy (2020) have recommended studying the extent of the impact of artificial intelligence applicability on employees' turnover and engagement in Egypt. Therefore, the purpose of this study is to examine hotel employees’ perception of AI and its impact on employees’ job insecurity and job engagement.

The study aims to fill a gap in the literature as recommended by Touni and Magdy (2020) by exploring the impact of artificial intelligence applicability on employees' turnover and engagement in Egypt. Also, the study will give insights to managerial positions about how the employees view artificial intelligence applications and what to do about it.

2. Literature Review

2.1. Overview of Artificial Intelligence

The idea of artificial intelligence essentially began with the invention of the first programming language by Ada Lovelace in 1820 (Henning, 2021), while work started seriously soon after World War II, and the term "Artificial Intelligence" was coined by John McCarthy in 1956 (Malinetsky & Smolin, 2021). John McCarthy proposed that any attribute of intelligence can be so accurately described that a machine can imitate human intelligence (Malinetsky & Smolin, 2021).

Whereas Alan Turing already envisioned the notion of the intelligence of machines in the 1950s (Grundner & Neuhofer, 2021). He published “Intelligent Machinery” in 1948 and “Computing

Machinery and Intelligence" in 1950, both of which will inspire future scientific research in AI (Turing, 1950). However, the hopes of expanding the applications of AI began to be seriously justified within a few decades later (Malinetsky & Smolin, 2021).

Nowadays, Ashri (2020) believes that the way the landscape is changing is in favor of the long-term growth of AI and the growing industry of AI-related technologies. AI currently covers a wide range of subfields, from the general learning and perception to the specific. AI is relevant to any intellectual task (Russell & Norvig, 2016). The changes are not only going to help spread AI, they are also going to make AI a must. AI will be a fundamental pillar into the construction of everything that is done (Russell & Norvig, 2016).

Apparently, the spending on AI and robotics rose globally from $12 billion in 2017 to $58 billion within four years in 2021 (Khaliq, Waqas, Nisar, Haider, & Asghar, 2022). According to Calo (2014) AI will replace millions of jobs and decrease employment rates significantly, creating additional challenges, such as rebuilding infrastructure, and adapting new laws and regulations. Combined with big data, AI perform operations and activities that surpass human actions in terms of velocity and relevance. Many fields and service sectors are already or will shortly be affected by these technological innovations (Wijayati et al., 2022).

2.2. Definition of Artificial Intelligence

2.2.1. Artificial Intelligence

Artificial intelligence generally means the capability of machines to exhibit human-like intelligence. AI's basic definition is established based on two key components, namely, autonomy and adaptiveness (Al-shami et al., 2021). AI refers to "machines performing cognitive functions usually associated with human minds, such as learning, interacting, and problem solving" (Raisch & Krakowski, 2021). Artificial intelligence as defined by the Encyclopedia Britannica is "the ability of a digital computer or computer-controlled robot to perform tasks commonly associated with intelligent beings" (Copeland, 2022). Through the use of algorithms, AI attempts to resolve human-related problems with the combined efforts of machine efficiency and human characteristics (Koo et al., 2021).

Based on its functionality, AI can be categorized into analytical AI, human-inspired AI, and humanized AI (Prentice, Weaven, & Wong, 2020). A number of academics suggest that there are four types of artificial intelligence, depending on their developmental order in the history of AI. They are as follows mechanical, analytical, intuitive, and empathetic. The four types of intelligence may be both ordinal and parallel: They are ordinal because some human intelligences (e.g., intuitive and empathetic ones) are more difficult to be imitated by AI and therefore take longer to develop successful AI applications. They may be parallel because once AI has reached a certain intelligence level, the intelligences that take AI longer to imitate are referred to as "advanced" levels of intelligence (M. H. Huang & Rust, 2018).

2.2.2. Robotics

Robotics, generally speaking, is the science of creating and building machines that are able to accomplish tasks that are conventionally performed by humans (Cain, Thomas, & Alonso Jr, 2019). In hospitality context, a robot is a "relatively autonomous physical device capable of movement and performing a service". It can also be defined as "system-based autonomous and adaptable interfaces that interact, communicate and deliver service to an organization's customers" (Wirtz et al., 2018).

In other words, robotics is the intersection of science, engineering and technology that produces an alternative for or imitates human actions (Milman, Tasci, & Zhang, 2020).

2.2.3. Big Data

Generally, big data is a term that describes huge bulks of high velocity, complex and variable data that require advanced methods and technologies to capture, store, distribute, manage, and analyze (Shehab, Badawy, & Arafat, 2021). It can also be defined as "a massive-scale data that is generated, recorded, stored and accumulated at high speed with advanced technologies and architectures in order to extract values through capturing and analytical processes." (H. Lv, Shi, & Gursoy, 2021).

To better understand big data, there are the multi V definitions starting from the 3 V definition by Doug Laney in 2001, which is considered to be the most appropriate representation of feature-oriented perspective. The 3 V definition holds that big data should have three characteristics: Volume, Variety and Velocity (H. Lv et al., 2021). Which capture the contemporary understanding of big diverse volumes of data that are generated at high speed in real time. Following this principle, the 3 V was extended to 4 V by Gantz and Reinsel (2011) by introducing the fourth characteristic of Value, which means that data must hold worth and relevance. Later, the IBM company developed the 5 V definition by adding the fifth characteristic of Veracity, which refers to the quality or truthfulness of big data (Elgendy & Elragal, 2014). The characteristics of big data are still emerging. Recently, researchers have added the 6 V of Variability which depicts Irregularity and Flexibility (Gandomi & Haider, 2015).

Nowadays, hospitality and tourism businesses heavily rely on interpreting and analyzing large volumes of data, including multi-modal data sets (numerical, categorical, time-series, image and text) (Samara, Magnisalis, & Peristeras, 2020). The massive amount of data available makes the information extraction phase more complicated and requires advanced techniques to analyze. With the current traveler leaving digital tracks before, during, and after their stay, technology allows us to create profiles that include the guest's satisfaction, preferences, geographical location, and spending habits (Pan & Yang, 2016).

2.2.4. Machine Learning

AI has made significant progress that was eventually confirmed since the 2000s with the emergence of Machine Learning "automatic learning: machines 'learn' from the datasets offered to them", whose latest development is "Deep Learning" (which relies on neural networks) (Wijayati et al., 2022). Machine learning refers to a computer's ability to make precise predictions by handling input data using a pre-defined algorithm (A. Huang, Chao, de la Mora Velasco, Bilgihan, & Wei, 2021).

Technically, machine learning follows Turing's approach of teaching a machine to perform specific tasks. By constructing a machine with sufficient analytical resources, offering guidance examples from real world data and by creating specific algorithms and tools that define a learning process, machines can advance their performance through learning by imitating, inferring patterns and examining hypotheses (Petropoulos, 2018).

2.3. Applications of Artificial Intelligence in Hospitality

Hospitality organizations are progressively investing in AI-powered systems which are becoming essential to provide guests with genuine and personalized experiences, through the collection and optimization of data. AI has gotten in hospitality in other ways. Prevalent examples of AI applications used in hospitality are smart hotel rooms; reviews tracking software; customer statistics monitoring

software, and chatbots. AI enables hospitality managers to provide smart hotel rooms that allow guests to interact with in-room facilities through beacons and sensors (e.g., Marriott International) (Buhalis & Leung, 2018).

2.3.1. Software and Cloud-based AI

Majority of bookings are today made through online channels. This generates a numerous amount of data that hoteliers can benefit from. Technology investments are growing towards becoming mandatory for hotel companies to gain competitive edge. Currently, revenue management is usually done using a dynamic pricing model in which rates are changed continuously on daily basis or even throughout the day. The use of Big Data and AI provides with real-time analyses and alerts directly about the forecasts with regards to the changing surrounding environment. This way, revenue managers can efficiently provide more accurate forecasts (Bounatirou & Lim, 2020). AI can personalize customers' expectations and identify their needs by collecting data from booking, transactions, or satisfaction surveys (Koo et al., 2021).

In recent years, some pioneering hotels have started to apply intelligent facial recognition technology to enhance their guest check-in services and operational efficiency (Xu, Zhang, Zhang, & Wang, 2020). For Example, investments in AI within Intercontinental Hotel Group (IHG), including the cloud-based platform Concerto, have helped the company in achieving better results within a short period of time (Bounatirou & Lim, 2020). Another example is AI platform Metis that can help tourism providers go through customer feedback such as surveys and reviews, evaluate performance and discover what guest are interested in (Gajdošík & Marciš, 2019). Marriott International Hotel Group installed a facial recognition system in their hotels with the association of Alibaba's Fliggy travel service platform. The hospitality organization reports that the facial recognition machine can identify the customer's ID photo during check-in/out within 1-3 min (Parvez, 2020).

2.3.2. Chatbots

Defined as "machine conversation systems that interact with human users via natural conversational language" (Shawar & Atwell, 2005), chatbots are disembodied conversational agents designed to interact with humans through text-based interfaces (Chi, Denton, & Gursoy, 2020). Given the rising market of smartphone and the increase of mobile communication, conversational agents in the form of chatbots have been widely adopted to communicate and interact with customers (Ukpabi, Aslam, & Karjaluoto, 2019).

The hospitality industry has employed AI to enhance the customer experience with the applications of AI chatbots. These chatbots are able to perform conversations with guests through auditory or text-based methods in order to improve service processes. Various hotels around the world use Ivy, a Direct Messenger, which automates all guest interaction and handles about 90% of requests in real-time. Another example is Rose which is a personal assistant used by The Cosmopolitan in LA, while you have Mario at Marriott. It is evident that AI and machine learning is going to have a huge impact on the hospitality industry and the evolution and adoption are only going to grow exponentially (Nayak, 2018).

2.3.3. Robots

Service robots are designed to have a human appearance and deliver different levels of services to hotel customers ranged from simple tasks to more sophisticated ones (Touni & Magdy, 2020). Robot assistance could reduce human workers' emotional labor. This idea implies that existing social robots may be useful even if their communication skills are not completely satisfying (Koo et al., 2021).

There are many instances of the using robots in the hospitality industry. Including Connie, a concierge robot implemented by the Hilton group (Citak, Owoc, & Weichbroth, 2021) named after the hotel chain's founder, Conrad Hilton (Milman et al., 2020), a robot that recommends local attractions to guests (Koo et al., 2021), the Henn-na Hotel opened in 2015 in Japan, is the first hotel to be almost entirely staffed by robots (Ivanov & Webster, 2019). In the Henn-na hotel robots can greet customers, check customers in and out, carry luggage, and clean rooms (Touni & Magdy, 2020). Henn-na Hotel succeeded in reducing labor costs by automating 70% of work as AI hotelier robots occupied the front desk and F&B departments (Rajesh, 2015). Marriott International also have Leo & Cleo, who can deliver room service during guests' stay (Koo et al., 2021). the Sheraton Hotels' Tug, the luggage and housekeeper robot, Spyce Kitchen's salad bar chef robot Penny, the robot server; Aloft Hotels' butler robots and security robots for airports (Go, Kang, & Suh, 2020).

2.3.4. Internet of Things (IoT)

Hotels have started to implement cutting-edge technologies (e.g., smart mirrors in guest rooms; facial recognition as a room key) (Lin & Mattila, 2021). In addition, AI and IoT-linked services have been developed and are operated in conjunction with an in-room TV management system. Some of the examples of IoT in the hotel accommodation sector are Marriott and Samsung are working on IoT hotel rooms to deepen personalized room experiences by leveraging mobile and voice-enabled technology. Users can communicate with virtual assistants to request services and control the room (Mercan et al., 2020). Hilton, on the other hand, developed an application, Fun Finder, that eases the indoor and outdoor navigation through the facilities in the resort and delivers targeted messages relying on Wi-Fi, and GPS data (Mercan et al., 2020). The Wynn Casino in Las Vegas is integrating Amazon Echo to digitalize hotel rooms to offer guests voice control of room lighting, temperature, TV, and draperies, in addition to offering multiple facilities leveraging Echo's personal assistant services (Prentice, Lopes, & Wang, 2020).

2.4. Artificial Intelligence in Egyptian Tourism and Hospitality Industry

Yasin, Abdelmaboud, Saad, and Qoura (2022) conducted a survey with AI experts from several hotels in Egypt, their results show that there is a consensus about AI efficiency, ease of use, quality, employee performance and speed of work achievement. they also found that Artificial intelligence automation and employees' performance are strongly correlated. According to Abdelmoaty and Soliman (2020), hotel managers were very interested in contributing to the formation of a smart travel experience for customers, and they thought that an Artificial intelligence technology will make some difference in the hotel sector in terms of the service provided to customers. On the other hand, they declared that high cost was the most common obstacle to use artificial intelligence applications.

Additionally, Touni and Magdy (2020) stated that all of their interviewees from top travel agencies and international hotel chains in Egypt are knowledgeable of AI technologies to different extents. However, none of them have adopted robots, 20% of travel agencies use chatbots, 60% of hotels use smart room services in their high-end suites, 30% provide smart meeting rooms and none of the hotels use chatbots. While Gaafar (2020) said that the majority of tourism companies are applying few tools of AI in their business. A limited number of hotels in Egypt have digital kiosks that enable customers to check-in/out and other services and all of the international hotel chains have mobile check-in/out applications. But not all of them offer online payment solutions (Touni & Magdy, 2020).

Currently, new hotels can adopt AI technologies as they have strong infrastructure and modern design. Hotels in the new administrative capital present services that depend on several AI

applications. However, the biggest obstacles to apply AI technologies in Egypt are cost, lack of qualified staff to operate and maintain the services and customers who prefer human interaction especially in resorts (Touni & Magdy, 2020). Another key obstacle to applying AI technologies is the lack of skilled staff (Abdelmoaty & Soliman, 2020).

In a related context, in November 2019, the Egyptian Cabinet approved the formation of the National Council for Artificial Intelligence, which includes representatives from all government bodies and independent experts in the field of artificial intelligence. The main goal of this council is to formulate, manage and implement Egypt's national strategy for artificial intelligence (Halawa et al., 2021).

2.5. Artificial Intelligence and Job Security

A job can be defined as "a comprised of a set of tasks that an employee performs". It requires the employee to have certain skills to get the tasks done (M. H. Huang & Rust, 2018). Job insecurity is defined as "an individual's overall concern for the continued existence of their job in the future" (Sverke, Hellgren, & Näswall, 2002).

Job insecurity is considered as one of the strongest impeding stressors that is closely connected with hospitality workplaces with a wide variety of negative consequences such as anxiety, emotional exhaustion, absenteeism, and low performance (Darvishmotevali & Ali, 2020). Researchers argue that artificial intelligence will directly replace 13% of jobs, including those that are more brain-intensive and more profitable, such as finance, accounting and senior management (Liu & Zhan, 2020). AI adoption may make employees feel insecure and employees are more likely to quit from their jobs (Brougham & Haar, 2017). A study from Oxford University predicted that 47% of jobs may be replaced by AI by 2033 (X. Lv, Yang, Qin, Cao, & Xu, 2022).

Currently, progress in machine and artificial intelligence capabilities is especially promising and threatening to the industry. Employees in lower-skilled positions are keenly aware of high risks that their tasks will be replaced by AI in near future (Koo et al., 2021). Research found strong evidence of fear of robots by females, non-Whites and those with less education (McClure, 2017). In addition, Pew Research Center (a nonpartisan American think tank) found that about 72 percent of Americans worry about job replacement by AI (Prentice, Lopes, et al., 2020). A research survey of the Turkish hotel employees was conducted, and they believed that the introduction of service robots could lead to increased unemployment (Vatan & Dogan, 2021). It is anticipated that about 47% of current jobs in the United States are at greater risk due to automation over the next 20 years, meaning humans will have to compete with AI in a wide range of cognitive tasks (Koo et al., 2021). However, employees in Japan may not fear AI and robotics as they would in the USA, as employees may not be treated as disposable assets in Japan as they were viewed in the USA (Yu, Xu, & Ashton, 2022).

2.6. Artificial Intelligence and Job Engagement

The term work engagement was first conceptualized by William Kahn in 1990 and defined as "the harnessing of employees' selves to their work roles by which they employ and express themselves physically, cognitively and emotionally during role performances". Job engagement can be referred to as "the simultaneous employment and expression of a person's 'preferred self in task behaviors that promote connections to work and to others, personal presence (physical, cognitive, and emotional) and active, full performance" (Kahn, 1990).

In addition, Job insecurity erodes work engagement (Karatepe, Rezapouraghdam, & Hassannia, 2020). Fear of future job loss diminishes employees' job engagement. Broadly speaking, job

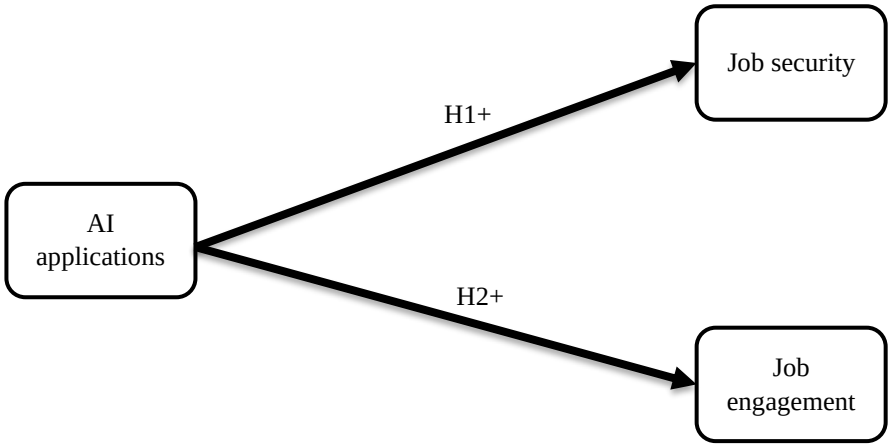

Figure (1): Research model

insecurity leads to a change in employees' perceptions about organizational values and makes them question whether their values and career goals fit with those of the company (Safavi & Karatepe, 2019).

3. Hypotheses of the Study

The following hypotheses have been formulated to understand the effects of artificial intelligence applications on hotel employees' job insecurity and job engagement. the study will test the following hypotheses, that are illustrated in figure (1):

H1: There is a relationship between AI applications in hotels and employees' job security.

H2: There is a relationship between AI applications in hotels and employees' job engagement.

4. Methodology

4.1. Nature of the Study

This study is descriptive analytical as analytical research is a continuation of descriptive research (Collis & Hussey, 2014). The study it aims at measuring the impact of artificial intelligence applications on employees' job security and job engagement in five-star hotels across Egypt.

A five-point Likert scale questionnaire was chosen as the primary data collection method as it was adopted in previous similar studies and deemed to be effective (Brougham & Haar, 2017; Koo et al., 2021; Li, Bonn, & Ye, 2019). The scale was designed to measure artificial intelligence applications, employees' job security and job engagement.

4.2. Population and Sampling

According to the Egyptian Hotel Association (2023), there are 127 five-star hotels in Egypt (excluding resorts). Employees of these hotels are the target population of the study. The reason for choosing five-star hotels is that they are more likely to implement AI applications (Touni & Magdy, 2020).

Purposive non-probability sampling technique was applied to target front of house employees and middle management as they are more likely to use and interact with AI applications, hence, constituting the target population for the research.

4.3. Questionnaire Design, Development and Pilot Study

A fairly extensive literature review was conducted to discuss issues relevant to the variables identified in the study framework, to ensure all relevant issues are incorporated in the questionnaire. The AI applications variable consists of four dimensions: software and cloud-based AI, chatbots, robots and internet of things; which consist of 8, 9, 8 and 8 statements respectively. The statements of AI applications were formed based on the literature reviewed in the previous chapter. The respondents were given a synopsis about AI and its dimension as well as practical examples utilized in the hotel industry in the cover letter of the survey.

The job security variable was adopted from Darvishmotevali and Ali (2020). While the job engagement variable was adopted from Koo et al. (2021). Each of the three dependent variables consists of 4 statements. Answers were rated on a five-point Likert questionnaire ranging from "Strongly agree" (5) to "Strongly disagree" (1). The questionnaire file is attached as a supplementary file.

4.4. Questionnaire Distribution and Data Collection

This study adopted an online survey method. The researcher contacted hotels through the e-mails provided in the Egyptian Hotels Association website. 103 hotels had an e-mail provided in the Egyptian hotel Association website. Those are the hotels the researcher was able to reach In the e-mail sent to hotels the researcher explained the objectives of the research and where it may be useful for both academics and industry practitioners. The researcher then asked to forward the link of the survey to around 10 of the frontline hotel employees.

The questionnaire was distributed in the beginning of October 2023. Three weeks after sending the e-mails, the researcher collected and tabulated the responses for analysis. A total of 623 responses were received, 442 were valid for analysis.

4.5. Validity and Reliability

4.5.1. Content Validity

The questionnaire was presented in its first image of (7) of the professors of tourism and hotels at Egyptian universities, The percentages of agreement of the university faculty members on each item of the questionnaire ranged between (71.4-100%), and the total agreement of the arbitrators on the items of the questionnaire was (85.7%). And about the Lawshe Content Validity Ratio (CVR), it was found that all items of the Questionnaire had acceptable content validity values, and the average content validity percentage for the questionnaire as a whole was (0.714), which is an acceptable validity percentage (Johnston & Wilkinson, 2009).

4.5.2. Internal Consistency Validity

The internal consistency validity of the questionnaire was calculated by calculating the correlation coefficients between the score of each dimension of the questionnaire and its total degrees. As shown in table (1).

Table (1): correlation coefficients between the score of each dimension of the questionnaire and its total degrees (n=35)

	Dimensions	Correlation Coefficients
AI Applications	Software and cloud-based AI	.999**
	Chatbots	.999**
	Robots	.985**
	Internet of Things	.972**
Job Security		.999**
Job Engagement		.998**

4.5.3. Questionnaire Reliability

The researcher calculated the reliability of the questionnaire using Cronbach's alpha method, Table (2) shows Reliability coefficients values using "Cronbach's alpha" method for the dimensions of the Questionnaire.

Table (2): Reliability Coefficients Values Using "Cronbach's alpha" method for the dimensions of the Questionnaire (n=35)

	Dimensions	Cronbach's α
AI Applications	Software and cloud-based AI	.852
	Chatbots	.874
	Robots	.866
	Internet of Things	.877
Job Security		.882
Job Engagement		.878
Total		**.893**

By calculating the questionnaire reliability using the Alpha Cronbach method, it is clear that it has a high degree of reliability (Field, 2009), which indicates the possibility of using it in the current research, and the credibility of the results that will result from the research.

4.6. Data Analysis Techniques

Pearson correlation coefficient was used to test the relationship between AI applications and each of the dependent variables as it an index of the linear or straight-line relationship between two variables which can be ordered. Correlations can be either positive or negative (Cramer & Howitt, 2004).

5. Results and Discussion

5.1. Respondents Profile

After data screening was completed, a description of the respondents' profile was reported in order to convey the context in which this research was explored. Table (3) displays the demographic profiles of respondents of the current study.

Table (3): Distribution of the study sample according to their socio-demographic and academic characteristics (N=442)

Variable	Categories	No.	%	Coefficient of Variation
Gender	Male	321	72.6	35%
	Female	121	27.4	
Education	Secondary Education	0	0	12.5%
	University Degree	410	92.8	
	Post-graduate Studies	32	7.2	
	Other	0	0	
Age	Younger than 25	101	22.9	42.4%
	25-34	157	35.5	
	35-44	143	32.4	
	45-54	30	6.8	
	55 or Older	11	2.5	
How long have you worked in the hotel industry?	Less than a year	55	12.4	46.9%
	1-5 years	172	38.9	
	6-10 years	110	24.9	
	11-15 years	9	2.0	
	16 years or more	96	21.7	
How long have you worked at this hotel?	Less than a year	127	28.7	50.9%
	1-5 years	120	27.1	
	6-10 years	130	29.4	
	11-15 years	24	5.4	
	16 years or more	41	9.3	

As seen in table (3), it is noticeable that around 75% of the study respondents are male. In addition, all respondents have a university degree or higher education, which is reasonable as the study population are frontline hotel employees. Around 70% of the respondents are between 25 and 45 years. Moreover, most of the study respondents have worked in the hospitality industry between one and five years.

5.2. Hypotheses Testing and Discussion

H1: There is a relationship between AI applications in hotels and employees' job security.

To test this hypothesis, Pearson correlation coefficient has been used, table (4) indicated Relationship Coefficients between AI applications in hotels and employees' job security.

Table (4): Relationship Coefficients between AI applications in hotels and employees' job security (n=442)

Variables	AI Applications				
	Software and Cloud-based AI	Chatbots	Robots	Internet of Things	Total Degrees
Job Security	.045	-.087	-.040	.161**	.011

** Relationship is significant at the 0.01 level (2-tailed).

* Relationship is significant at the 0.05 level (2-tailed).

As illustrated in Table (4) There is no significant relationship at level of (0.05) between Software and Cloud-based AI and Job Security. There is also no significant relationship at level of (0.05) between

Chatbots and Job Security. There is no significant relationship at level of (0.05) between Robots and Job Security as well. However, there is positive significant relationship at level of (0.01) between Internet of things and Job Security. In general, there is no significant relationship at level of (0.05) between total degrees of AI applications and Job Security.

AI not affecting job security could be because the use of AI in Egypt hasn't reached its pinnacle yet; Due to the high cost of good infrastructure to implement AI software as well as the need to find well-trained employees to run and maintain these applications which would come as additional cost. To remedy that, there should be a state-wide plan to improve the internet infrastructure and to focus more on AI curriculums in universities. This contradicts Koo et al. (2021), who found out that AI has significant effect on job insecurity.

H2: There is a relationship between AI applications in hotels and employees' job engagement.

To test this hypothesis, Pearson correlation coefficient has been used, table (5) indicated Relationship Coefficients between AI applications in hotels and employees' job engagement.

Table (5): Relationship Coefficients between AI applications in hotels and employees' job engagement (n=442)

Variables	AI Applications				
	Software and Cloud-based AI	Chatbots	Robots	Internet of Things	Total Degrees
Job Engagement	.101*	-.194**	.017	.407**	.079

** Relationship is significant at the 0.01 level (2-tailed).

* Relationship is significant at the 0.05 level (2-tailed).

As illustrated in Table (5) it can be seen that there is positive significant relationship at level of (0.05) between Software and Cloud-based AI and employees' job engagement. While there is negative significant relationship at level of (0.01) between Chatbots and employees' job engagement. There is no significant relationship at level of (0.05) between Robots and employees' job engagement. There is positive significant relationship at level of (0.01) between Internet of things and employees' job engagement. In General, there is no significant relationship at level of (0.05) between total degrees of AI applications and employees' job engagement.

Despite the existence of positive and negative relationships between AI applications dimensions, AI applications as a whole do not affect employees' job engagement. Which quarrels with Van Lange, Kruglanski, and Higgins (2012) who claimed that AI affects employees' motivation and personality. The reason behind the lack of the relationship between AI applications and job engagement could be backtracked to the same explanations in the previous hypothesis.

6. Conclusion and Recommendations

The main purpose of the research is to study the impact of artificial intelligence applications on employees' job security and engagement. In general, there is no significant relationship between AI applications and job security, between AI applications and job engagement. However, there is a significant positive relationship between internet of things and job security. Moreover, there is a significant positive relationship between both software and cloud-based AI and internet of things and job engagement; while the is negative significant relationship between chatbots and job engagement.

The insignificance of the relationship between AI applications and employees job security and engagement could be due to the lack of awareness about AI or because employees think they are safe because of the high cost of implementing and maintain AI applications, especially if there is poor infrastructure as stated by Touni and Magdy (2020). Therefore, it is recommended that hospitality practitioners along with the government invest in strong AI infrastructure as it is the trend nowadays. Along with that there should be more focus on training and assurance for employees about AI. AI curriculums should get more attention in Egyptian universities.

7. Limitations and Future Research

There were challenges that met the researcher in collecting the primary data for the research. I.e., not all five-star hotels had an email and a website on the Egyptian Hotel Association website, which hindered the access to these hotels. Which may be a confirmation that there is poor infrastructure to implement AI application in Egypt in the near future.

Since this study found that there is no significant relationship between AI applications and job security, between AI applications and job engagement. Future research could focus on discussing the reasons behind the absence of the relationship and the obstacles behind building a strong infrastructure for AI application.

References

Abdelmoaty, G., & Soliman, S. (2020). Smart Technology Applications in Tourism and Hospitality Industry of the New Administrative Capital, Egypt. *Journal of Association of Arab Universities for Tourism and Hospitality*, *0*(0), 0-0. doi:10.21608/jaauth.2020.47549.1085

Al-shami, S. A. H., Al Mamun, A., Ahmed, E. M., & Rashid, N. (2021). Artificial Intelligent Towards Hotels' Competitive Advantage. An Exploratory Study From the UAE. *foresight*. doi:10.1108/fs-01-2021-0014

Alekseeva, L., Azar, J., Giné, M., Samila, S., & Taska, B. (2021). The Demand for AI Skills in the Labor Market. *Labour Economics*, *71*. doi:10.1016/j.labeco.2021.102002

Ashri, R. (2020). *The AI-Powered Workplace*: Apress.

Bounatirou, M., & Lim, A. (2020). A Case Study on the Impact of Artificial Intelligence on a Hospitality Company. In *Sustainable Hospitality Management* (pp. 179-187).

Brougham, D., & Haar, J. (2017). Smart Technology, Artificial Intelligence, Robotics, and Algorithms (STARA): Employees' perceptions of our future workplace. *Journal of Management & Organization*, *24*(2), 239-257. doi:10.1017/jmo.2016.55

Buhalis, D., & Leung, R. (2018). Smart Hospitality—Interconnectivity and Interoperability Towards an Ecosystem. *International Journal of Hospitality Management*, *71*, 41-50. doi:10.1016/j.ijhm.2017.11.011

Cain, L. N., Thomas, J. H., & Alonso Jr, M. (2019). From Sci-Fi to Sci-Fact: The State of Robotics and AI in the Hospitality Industry. *Journal of Hospitality and Tourism Technology*, *10*(4), 624-650. doi:10.1108/jhtt-07-2018-0066

Calo, R. (2014). Robotics and the New Cyberlaw. *SSRN Electronic Journal*. doi:10.2139/ssrn.2402972

Chi, O. H., Denton, G., & Gursoy, D. (2020). Artificially Intelligent Device Use in Service Delivery: A Systematic Review, Synthesis, and Research Agenda. *Journal of Hospitality Marketing & Management*, *29*(7), 757-786. doi:10.1080/19368623.2020.1721394

Citak, J., Owoc, M. L., & Weichbroth, P. (2021). A Note on the Applications of Artificial Intelligence in the Hospitality Industry: Preliminary Results of a Survey. *Procedia Computer Science, 192*, 4552-4559. doi:10.1016/j.procs.2021.09.233

Collis, J., & Hussey, R. (2014). *Business Research : A Practical Guide for Undergraduate and Postgraduate Students* (Fourth edition / Jill Collis & Roger Hussey. ed.). Basingstoke: Palgrave Macmillan.

Copeland, B. J. (2022). Artificial Intelligence. Retrieved from https://www.britannica.com/technology/artificial-intelligence

Cramer, D., & Howitt, D. (Eds.) (2004) The SAGE Dictionary of Statistics. London.

Darvishmotevali, M., & Ali, F. (2020). Job Insecurity, Subjective Well-being and Job Performance: The Moderating Role of Psychological Capital. *International Journal of Hospitality Management, 87*. doi:10.1016/j.ijhm.2020.102462

Egyptian Hotel Association. (2023). EHA | Hotels. Retrieved from http://egyptianhotels.org/Home/Hotels?search=&CategoriesIDFKEN=5&HotelsTypesIDFKEN=3&CityIDFKEN=

Elgendy, N., & Elragal, A. (2014). Big Data Analytics: A Literature Review Paper. In *Advances in Data Mining. Applications and Theoretical Aspects* (pp. 214-227).

Field, A. (2009). *Discovering Statistics Using SPSS* (Third ed.). London: SAGE Publications.

Gaafar, H. (2020). Artificial Intelligence in Egyptian Tourism Companies: Implementation and Perception. *Journal of Association of Arab Universities for Tourism and Hospitality*, *0*(0), 0-0. doi:10.21608/jaauth.2020.31704.1028

Gajdošík, T., & Marciš, M. (2019). Artificial Intelligence Tools for Smart Tourism Development. In *Artificial Intelligence Methods in Intelligent Algorithms* (pp. 392-402).

Gandomi, A., & Haider, M. (2015). Beyond the Hype: Big Data Concepts, Methods, and Analytics. *International Journal of Information Management, 35*(2), 137-144. doi:10.1016/j.ijinfomgt.2014.10.007

Gantz, J., & Reinsel, D. (2011). Extracting Value From Chaos. Retrieved from http://www.kushima.org/wp-content/uploads/2013/05/DigitalUniverse2011.pdf

Go, H., Kang, M., & Suh, S. C. (2020). Machine Learning of Robots in Tourism and Hospitality: Interactive Technology Acceptance Model (iTAM) – Cutting Edge. *Tourism Review*, *75*(4), 625-636. doi:10.1108/tr-02-2019-0062

Grundner, L., & Neuhofer, B. (2021). The Bright and Dark Sides of Artificial Intelligence: A Futures Perspective on Tourist Destination Experiences. *Journal of Destination Marketing & Management, 19*. doi:10.1016/j.jdmm.2020.100511

Halawa, D., Sobaih, S., Ibrahim, M., Naguib, S., Mahmoud, S., Al Amir, S., . . . Elwany, N. (Eds.) (2021). *National Strategy for Artificial Intelligence*: Ministry of Communications and Information Technology, Egypt.

Henning, K. (2021). How Did Artificial Intelligence Come Into Being and Where Do We Stand Today? In *Gamechanger AI* (pp. 21-32).

Huang, A., Chao, Y., de la Mora Velasco, E., Bilgihan, A., & Wei, W. (2021). When Artificial Intelligence Meets the Hospitality and Tourism Industry: An Assessment Framework to Inform Theory and Management. *Journal of Hospitality and Tourism Insights*. doi:10.1108/jhti-01-2021-0021

Huang, M. H., & Rust, R. T. (2018). Artificial Intelligence in Service. *Journal of Service Research, 21*(2), 155-172. doi:10.1177/1094670517752459

Ivanov, S., & Webster, C. (2019). *Robots, Artificial Intelligence, and Service Automation in Travel, Tourism and Hospitality*.

Johnston, P., & Wilkinson, K. (2009). Enhancing Validity of Critical Tasks Selected for College and University Program Portfolios. *Natl Forum Teacher Educ J, 19*.

Kahn, W. A. (1990). Psychological Conditions of Personal Engagement and Disengagement at Work. *Academy of Management Journal, 33*(4), 692-724. doi:10.5465/256287

Karatepe, O. M., Rezapouraghdam, H., & Hassannia, R. (2020). Job Insecurity, Work Engagement and Their Effects on Hotel Employees' Non-Green and Nonattendance Behaviors. *International Journal of Hospitality Management, 87*. doi:10.1016/j.ijhm.2020.102472

Khaliq, A., Waqas, A., Nisar, Q. A., Haider, S., & Asghar, Z. (2022). Application Of AI And Robotics in Hospitality Sector: A Resource Gain and Resource Loss Perspective. *Technology in Society, 68*. doi:10.1016/j.techsoc.2021.101807

Koo, B., Curtis, C., & Ryan, B. (2021). Examining the Impact of Artificial Intelligence on Hotel Employees Through Job Insecurity Perspectives. *International Journal of Hospitality Management, 95*. doi:10.1016/j.ijhm.2020.102763

Li, J., Bonn, M. A., & Ye, B. H. (2019). Hotel Employee's Artificial Intelligence and Robotics Awareness and Its Impact on Turnover Intention: The Moderating Roles of Perceived Organizational Support and Competitive Psychological Climate. *Tourism Management, 73*, 172-181. doi:10.1016/j.tourman.2019.02.006

Lin, I. Y., & Mattila, A. S. (2021). The Value of Service Robots From the Hotel Guest's Perspective: A Mixed-Method Approach. *International Journal of Hospitality Management, 94*. doi:10.1016/j.ijhm.2021.102876

Liu, R., & Zhan, Y. (2020). The Impact of Artificial Intelligence on Job Insecurity: A Moderating Role Based on Vocational Learning Capabilities. *Journal of Physics: Conference Series, 1629*(1). doi:10.1088/1742-6596/1629/1/012034

Lv, H., Shi, S., & Gursoy, D. (2021). A Look Back and a Leap Forward: A Review and Synthesis of Big Data and Artificial Intelligence Literature in Hospitality and Tourism. *Journal of Hospitality Marketing & Management, 31*(2), 145-175. doi:10.1080/19368623.2021.1937434

Lv, X., Yang, Y., Qin, D., Cao, X., & Xu, H. (2022). Artificial Intelligence Service Recovery: The Role of Empathic Response in Hospitality Customers' Continuous Usage Intention. *Computers in Human Behavior, 126*. doi:10.1016/j.chb.2021.106993

Malinetsky, G., & Smolin, V. (2021). The Artificial Intelligence Influence on Real Sociality. *Procedia Computer Science, 186*, 344-351. doi:10.1016/j.procs.2021.04.155

McClure, P. K. (2017). "You're Fired," Says the Robot. *Social Science Computer Review, 36*(2), 139-156. doi:10.1177/0894439317698637

Mercan, S., Cain, L., Akkaya, K., Cebe, M., Uluagac, S., Alonso, M., & Cobanoglu, C. (2020). Improving the Service Industry With Hyper-Connectivity: IoT in Hospitality. *International Journal of Contemporary Hospitality Management, 33*(1), 243-262. doi:10.1108/ijchm-06-2020-0621

Milman, A., Tasci, A., & Zhang, T. (2020). Perceived Robotic Server Qualities and Functions Explaining Customer Loyalty in the Theme Park Context. *International Journal of Contemporary Hospitality Management, 32*(12), 3895-3923. doi:10.1108/ijchm-06-2020-0597

Nayak, A. (2018). Artificial Intelligence an Enabler for Intelligent Hotels. Retrieved from http://www.hospitalitybizindia.com/detailNews.aspx?aid=28397&sid=5

Pan, B., & Yang, Y. (2016). Forecasting Destination Weekly Hotel Occupancy With Big Data. *Journal of Travel Research, 56*(7), 957-970. doi:10.1177/0047287516669050

Parvez, M. O. (2020). Use of Machine Learning Technology for Tourist and Organizational Services: High-Tech Innovation in the Hospitality Industry. *Journal of Tourism Futures, 7*(2), 240-244. doi:10.1108/jtf-09-2019-0083

Petropoulos, G. (2018). The Impact of Artificial Intelligence on Employment. In M. Neufeind, J. O'Reilly, & F. Ranft (Eds.), *Work in the Digital Age* (pp. 119-132): Rowman & Littlefield.

Prentice, C., Lopes, S. D., & Wang, X. (2020). The Impact of Artificial Intelligence and Employee Service Quality on Customer Satisfaction and Loyalty. *Journal of Hospitality Marketing & Management, 29*(7), 739-756. doi:10.1080/19368623.2020.1722304

Prentice, C., Weaven, S., & Wong, I. A. (2020). Linking AI Quality Performance and Customer Engagement: The Moderating Effect of AI Preference. *International Journal of Hospitality Management, 90*. doi:10.1016/j.ijhm.2020.102629

Raisch, S., & Krakowski, S. (2021). Artificial Intelligence and Management: The Automation–Augmentation Paradox. *Academy of Management Review, 46*(1), 192-210. doi:10.5465/amr.2018.0072

Rajesh, M. (2015). Inside Japan's First Robot-staffed Hotel. Retrieved from https://www.theguardian.com/travel/2015/aug/14/japan-henn-na-hotel-staffed-by-robots

Russell, S. J., & Norvig, P. (2016). *Artificial Intelligence a Modern Approach* (Third ed.): Pearson Education Limited.

Safavi, H. P., & Karatepe, O. M. (2019). The Effect of Job Insecurity on Employees' Job Outcomes: The Mediating Role of Job Embeddedness. *Journal of Management Development, 38*(4), 288-297. doi:10.1108/jmd-01-2018-0004

Samara, D., Magnisalis, I., & Peristeras, V. (2020). Artificial Intelligence and Big Data in Tourism: A Systematic Literature Review. *Journal of Hospitality and Tourism Technology, 11*(2), 343-367. doi:10.1108/jhtt-12-2018-0118

Shawar, B. A., & Atwell, E. S. (2005). Using Corpora in Machine-Learning Chatbot Systems. *International Journal of Corpus Linguistics, 10*(4), 489-516. doi:10.1075/ijcl.10.4.06sha

Shehab, N., Badawy, M., & Arafat, H. (2021). Big Data Analytics and Preprocessing. In *Machine Learning and Big Data Analytics Paradigms: Analysis, Applications and Challenges* (pp. 25-43).

Sverke, M., Hellgren, J., & Näswall, K. (2002). No Security: A Meta-Analysis and Review of Job Insecurity and its Consequences. *Journal of Occupational Health Psychology, 7*(3), 242-264. doi:10.1037/1076-8998.7.3.242

Touni, R., & Magdy, a. (2020). The Application of Robots, Artificial Intelligence, and Service Automation in the Egyptian Tourism and Hospitality Sector (Possibilities, Obstacles, Pros, and Cons). *Journal of Association of Arab Universities for Tourism and Hospitality, 19*(3), 267-288. doi:10.21608/jaauth.2021.60834.1126

Turing, A. M. (1950). I.—Computing Machinery and Intelligence. *Mind, LIX*(236), 433-460. doi:10.1093/mind/LIX.236.433

Ukpabi, D. C., Aslam, B., & Karjaluoto, H. (2019). Chatbot Adoption in Tourism Services: A Conceptual Exploration. In *Robots, Artificial Intelligence, and Service Automation in Travel, Tourism and Hospitality* (pp. 105-121).

Van Lange, P., Kruglanski, A., & Higgins, E. (2012). *Handbook of Theories of Social Psychology: Volume 1*.

Vatan, A., & Dogan, S. (2021). What Do Hotel Employees Think About Service Robots? A Qualitative Study in Turkey. *Tourism Management Perspectives, 37*. doi:10.1016/j.tmp.2020.100775

Wijayati, D. T., Rahman, Z., Fahrullah, A. r., Rahman, M. F. W., Arifah, I. D. C., & Kautsar, A. (2022). A Study of Artificial Intelligence on Employee Performance and Work Engagement: The Moderating Role of Change Leadership. *International Journal of Manpower, 43*(2), 486-512. doi:10.1108/ijm-07-2021-0423

Wirtz, J., Patterson, P. G., Kunz, W. H., Gruber, T., Lu, V. N., Paluch, S., & Martins, A. (2018). Brave New World: Service Robots in the Frontline. *Journal of Service Management, 29*(5), 907-931. doi:10.1108/josm-04-2018-0119

Xu, F. Z., Zhang, Y., Zhang, T., & Wang, J. (2020). Facial Recognition Check-in Services at Hotels. *Journal of Hospitality Marketing & Management, 30*(3), 373-393. doi:10.1080/19368623.2020.1813670

Yasin, E. S. A., Abdelmaboud, A. E., Saad, H. E., & Qoura, O. E. (2022). Rebooting Human Resources: Upskilling for Artificial Intelligence in the Egyptian Hotel Sector. *Journal of The Faculty of Tourism and Hotels, University of Sadat City, 6*(1), 1-17. doi:10.21608/mfth.2022.238088

Yu, X., Xu, S., & Ashton, M. (2022). Antecedents and Outcomes of Artificial Intelligence Adoption and Application in The Workplace: The Socio-Technical System Theory Perspective. *Information Technology & People*. doi:10.1108/itp-04-2021-0254