

## **Rebooting human resources: Upskilling for artificial intelligence in the Egyptian hotel sector**

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### **Abstract**

Artificial Intelligence (AI) is the most recent technological trend that is increasingly being integrated into our daily lives. AI is used in a variety of fields. As a result, one of the most important fields to benefit from these technologies is employees. On the other hand, it threatens to change jobs. Tourism and hospitality businesses around the world are increasingly relying on robotics, artificial intelligence, and service automation (RAISA) technologies. It has been largely ignored in the Egyptian tourism and hospitality industries because there is little research on this topic. As a result, there is a dearth of research on artificial intelligence and employee performance in the hotel sector. The research aims to look into the impact of artificial intelligence on employee performance in the hotel sector and explore the reasons for the reluctance of hotels in Egypt to apply modern technology. data were gathered from managers and employees working in five-star hotels in greater Cairo, Egypt, while primary data was gathered through an empirical study conducted by questionnaire on a convenience sample of employees and managers in hotels, and the data were analyzed using frequencies and descriptive analysis. Finally, using SPSS version 25, simple linear regressions were used to test the influence of artificial intelligence contains on employee performance in the hotel sector. The results illustrate that the hotel employs artificial intelligence; additionally, there is a relationship between artificial intelligence dimensions and employee performance dimensions. Finally, the results indicate that the total dimensions of artificial intelligence have a significant impact on employee performance dimensions in the hotel sector. Efficiency has the greatest impact on employee performance, followed by ease of use, whereas Automation has no significant impact on total employee performance dimensions. The research suggests conducting similar studies in other sectors in Egypt as well as the same sector outside Egypt to test the generalizability of its findings, so this research may be considered one of the limited studies that discuss the impact of artificial intelligence on employee performance in the hotel sector.

**Keywords:** Artificial Intelligence (AI), Employees' Performance, hotels, Egypt

### **Introduction**

According to Cappelli *et al.*, (2019) artificial intelligence (AI), applications harm employees' behavior, and hotels must confirm their involvement because it is critical to their success. Fedorov, *et al.*, (2019) Artificial intelligence technologies have a major influence on a company's business strategy and HR practices and are widely regarded as a real threat to the jobs of human employees. According to Nunn, (2019), AI is becoming a key driver in job-candidate matching and automating communications with candidates. In arguably the two most important areas where AI is most effective, in terms of eliminating human bias and increasing efficiency in candidate evaluation and communication. Parveen and Palaniammal, (2019) stated that artificial intelligence will automate all human resource management functions such as recruitment, selection, and performance management.

The research problem stems from the reality of work and after showing some interviews with employees they complained that their hotels seek to reduce costs and apply artificial

intelligence, making employees feel threatened particularly those with weak abilities. The research looks into the impact of artificial intelligence on employee performance in the hotel sector.

Arntz *et al.*, (2016) argued that technological unemployment due to workers looking for new jobs after being laid off is likely to increase in the coming years as artificial intelligence advances. Deloitte, (2016) suggested that the use of advanced robotics and automation technologies could result in the loss of up to 15 million jobs in the United Kingdom. Tandon, *et al.*, (2017) discussed a human recruiter is essential for middle management and senior management hires and that companies should only consider hiring managers through human recruiters. Frontier, (2018) discussed that recent industrial automation has been linked to a decline in developed employment and earnings for workers with low and medium levels of formal education. Adopting RAISA technologies in a TTH firm may result in significant non-financial costs. To begin with, employees may perceive technologies as a threat to their jobs and resist using them. Although RAISA technologies have the potential to increase employee productivity and relieve them of repetitive and dull tasks, employees may view the implementation of RAISA in a company as the first step toward their replacement, For the implementation of RAISA technologies that account for human resistance and sabotage (Ivanov and Webster, 2018) Training employees to use new technology, as well as open and transparent communication between managers and employees. According to Ivanov, (2017), Many workers in the hospitality industry are concerned that increased automation will displace them, but the human touch is uniquely necessary and advantageous in this industry, and automation can be more effective as a tool to empower employees. Smart technology can be used to improve worker performance rather than make humans obsolete in the industry.

Based on the artificial intelligence components, the following questions:

1. Is artificial intelligence automation affecting the performance of hotel employees?
2. Does artificial intelligence efficiency affect employee performance in the hotel industry?
3. Does the ease of use of artificial intelligence affect staff performance in the hotel industry?

## **Literature Review**

### **Artificial Intelligence Dimensions**

Prasanna and Kusuma (2019) indicated that artificial intelligence (AI) is a tool that uses human intelligence in several fields to improve performance, and it is a new technology that is used in all industries to increase productivity and performance. In summary, artificial intelligence is a computer system that can perform routine responsibilities that would normally require human intelligence. Machines stimulate human intelligence methods such as learning, reasoning, and self-correction. According to Rifkin, (1995) artificial intelligence is the art of generating machines that perform jobs that require intelligence when performed by humans. Arntz *et al.*, (2016) clear artificial intelligence as the ability of machines to perform human-like tasks. According to Russell and Norvig, (2016) artificial intelligence (AI) can be defined as computer programs capable of performing intelligent tasks. According to studies artificial intelligence declare machine work processes that would necessitate intelligence if performed by humans. Jackson, (2019) argues that it is widely acknowledged that artificial intelligence is a technology that is now influencing how users relate with and are influenced by the internet.

**Automation:** Rifkin, (1995) Automation is described as the use of control systems to automate the operation of equipment such as machinery, factory operations, and other applications and vehicles. Tzafestas, (2009) the term "automation" refers to processes and activities that can be monitored and controlled more efficiently by machines than by humans.

Groover, (2014) defined automation as the technology that allows a process or procedure to be carried out with little or no human intervention. Altemeyer, (2019) it is believed that the use of technology in a corporation to do repetitive jobs or processes where manual labor can be replaced. Wang and Siau, (2019) defined automation as the use of digital technology to transfer out processes to complete a workflow or function. To summarize, automation is the use of machines and technology to make processes run on their own without the need for human intervention, it entails control systems to run equipment and applications with minimal human intervention.

**Efficiency:** Samset (1998) defined efficiency as a measure of success of the project's goal, or as a measure of the project's long-term significance. Sufian *et al.*, (2013) supposed that efficiency is the extent to which a firm has been able to change its inputs into outputs following its progressive goal. Olsson (2017) stated that efficiency is connected to generating direct outputs and adding value for owners and users. Palmer and Torgerson (2018) defined efficiency as the connection between input resources (costs, labor, capital, or equipment) and intermediate outputs (numbers treated, waiting time, etc.). Ashtiani *et al.*, (2019) said that efficiency is the proportion of work done or energy formed by a machine, engine, or other devices to the amount of energy supplied to it, usually expressed as a percentage. Sattar *et al.*, (2019) defined efficiency as the level of performance characterized by using the least amount of input to produce the greatest amount of output. Efficiency is how well a machine does its job and how well it does it without wasting materials, energy, time, money, or effort.

**Ease of Use:** Lee and Park, (2008) defined it as the degree to which a user can use a detailed system without exerting major effort. Jen and Hung, (2010) said that It is the ease with which artificial intelligence can be understood and used by anyone. Lim, *et al.*, (2011) stated that the least amount of effort that a user can expend when using technology is referred to as ease of use. As a result, Jung and Yim (2016) defined it as a press to use technology more frequently. Gursoy, *et al.*, (2019) defined ease of use as the degree to which users can easily know and control the application. Ease of use is how easy it is for people to understand and measure how well an application works.

### **Employees' Performance**

Performance is a main multifaceted concept aimed at doing results and has a strong link to an organization's strategic goals (Mwita, 2000). Employee performance refers to job-related actions and how well those activities were carried out by employees. The most important element for any organization is the performance of its employees because an organization's success or failure is determined by an employee's performance. Employees' performance can be defined as the behaviors that employees exhibit at work that results in the achievement of the organization's desired outcomes in terms of job quality, job quantity, and job time. (Nan *et al.*, 2018). According to Peterson and Plowman (1953) Meeting the set criteria and standards for procurement, production, quality inspection, and delivery of goods and services constitutes job quality. Job quantity refers to the output units produced by employees' actions, such as product quantity, waste quantity, and sales figures. Job time concerns the amount of time required to complete work-related activities about the task's difficulty. Knowledge, skills, and attitude are all repeated aspects in the examined literature; practically all authors have measured them as core staff competencies. By and large, knowledge has been regarded as a component of employee competencies (Messick, 1984 in (The Psychology of Educational Measurement). This dimension has also been advanced by several authors as Skills several authors consider skills, as core employee competency that affects service performance and organizational excellence. On the other side, attitude is a core dimension of the employee, and competencies have also been accepted and developed (Gonczi, 1994).

**Methodology**

The researchers had a thorough argument with AI experts from several hotels regarding the original questionnaires relating to AI dimensionality before the survey. To approve the validity of the questionnaire (Tabachnick, Fidell, and Ullman, 2007) and ensure a survey completion time of fewer than 15 minutes to minimize respondent fatigue. A pilot test was shown with 20 randomly selected employees who have worked with AI tools in hotels after this testing, the questionnaire was changed based on feedback provided by these participants. Rewording the items to make them clearer was one of the changes and simplifying difficult sentences to improve validity and readability. To accomplish the objectives of this research, a questionnaire was designed to investigate the impact of artificial intelligence dimensions on employees' performance dimensions. Finn *et al.*, (2000) defined population as the target audience, the group of people that will ask to respond to research questions. This population must be reasonable in size because having a narrow size of the population will limit resulting data, and if have a large size of the population it will cost more money, time, and effort, and to overcome the study of a large population is sampling. This sampling should be the representative and appropriate size of the population. This research population consists of managers and employees at five-star hotels in Greater Cairo in Egypt. The sampling should include details and how the sample will be chosen (Gray, 2013). It was found that the number of five-star hotels is 28 hotels, there are 18 hotels in Cairo and 10 hotels in Giza city) *According to the Egyptian hotel guide (the Egyptian hotel Association, 2020)*. The researcher was unable to determine the size of the sample used in the study because there are no statistics on the number of employees in five-star hotels. The research used a convenience sample as well as a simple random sample. In the current research, an Arabic copy of the questionnaire was distributed to managers and employees; the total number of forms distributed was 400; from these 400 copies, 380 forms were reached and answered; 20 invalid questionnaires were excluded.

**Results and Discussions**

The weighted average of the sample's responses to questions in the form of a five-point Likert scale to determine the direction of the respondents' opinions (Attitude).

**Table (1): Descriptive Statistics for AI Automation**

AI Automation	Attitude	N	Mean	S. D	Percentage				
					SD	D	N	A	SA
Hotels use AI to perform processes without human Intervention.	Agree	380	3.64	1.36	14.7	6.8	8.9	38.4	31.1
Hotels use AI to reduce administrative workload.	Agree	380	3.81	1.29	7.1	14.5	8.9	29.2	40.3
Hotels use AI to replace manual tasks.	Agree	380	3.89	.75	.7.1	6.8	8.9	43.9	33.2
Hotels use AI to substitute repetitive tasks.	Agree	380	4.11	1.15	7.1		7.9	44.7	40.3
Hotels use AI to avoid errors automatically.	Agree	380	4.02	1.02	7.1		7.9	52.9	32.0

Artificial intelligence can help me in making important decisions in the hotel	Agree	380	4.23	1.10	7.1		8.9	30.0	53.9
Artificial intelligence can protect the privacy of yourself and others	Agree	380	4.09	1.05	7.1		8.9	44.2	39.7
Applying AI is a modern trend to follow	Agree	380	4.09	1.05	7.1	8.9		44.2	39.7
mean	Agree	380	3.93						

(SD= strongly disagree, D= Disagree, N= Neutral, A= Agree, SA= strongly agree)

Results indicate that variables' means choice from 4.23 to 3.64; with a grand mean of 3.93 which is near to the choice (4) "agree". This result indicates that agrees with the AI Automation dimension. Most of the respondent's perception of the dimension of AI Automation was acceptable as the grand mean (**3.93**), which means that respondents agree with the dimension of AI Automation and the standard deviations refer to the accepted normality of data distribution, The standard deviation of the previous indicators illustrations that the researcher can rely on the mean to provide a meaningful representation of the data. As a standard deviation from 1.64 to .75 is not far off from the mean, indicating that a majority of data points are positioned close to the mean, The closer the standard deviation is to 0, the more reliable the mean is, that though standard deviation values are close to 0 which tells that there is little volatility in the sample. On the other hand, it is also found that the highest indicator for respondents is "Artificial intelligence can help me in making important decisions in the hotel where its mean value is 4.23 as 44.6 %. These results agree with Rifkin, (1995) Tzafestas, (2009) Groover, (2014) Altemeyer, (2019) Wang and Siau, (2019). In summary, automation is the use of machines and technology to make methods run on their own without human effort. It contains the use of control systems for operating equipment and applications with minimal human intervention.

**Table (2): Descriptive Statistics for AI Efficiency**

AI Efficiency	Attitude	N	Mean	S. D	Percentage				
					SD	D	N	A	SA
Hotels use AI to convert resources efficiently (fewer inputs).	Agree	380	4.13	.99	7.1		,8	56.6	35.5
Hotels use AI to change inputs into outputs with high quality.	strongly agree	380	4.26	1.04	7.1		1.8	41.6	49.5
Hotels Cost-effectively use AI	strongly agree	380	4.26	1.04	7.1		1.8	41.6	49.5
Hotels use AI to improve productivity	strongly agree	380	4.41	1.05	7.1		,8	28.4	63.7

Hotels use AI to speed up working processes.	strongly agree	380	4.33	1.04	7.1		.8	36.1	56.1
AI can help me find lost data	strongly agree	380	4.32	1.05	7.1		1.8	35.3	55.8
AI can help display hard-to-measure data	strongly agree	380	4.25	1.04	7.1		1.8	42.4	48.7
AI works more effectively than humans	strongly agree	380	4.25	1.04	7.1	8.9	1.8	42.4	48.7
mean	strongly agree	380	4.27						

(SD= strongly disagree, D= Disagree, N= Neutral, A= Agree, SA= strongly agree)

Results indicate that variables' means choice from 4.13 to 4.41; with a grand mean of **4.27** which is near to the choice (5) “strongly agree”, this result shows that strongly agree with the AI Efficiency dimension. Most of the respondent's perception of the dimension of AI Efficiency was acceptable as the grand mean (**4.27**), which means that respondents strongly agree with the dimension of AI Efficiency and the standard deviations refer to the accepted normality of data distribution, The standard deviation of the previous indicators confirmations that the researcher can rely on the mean to provide a meaningful representation of the data. As a standard deviation from 1.05 to .99 is not far off from the mean, indicating that a majority of data points are positioned close to the mean, The closer the standard deviation is to 0, the more reliable the mean is, More than that though standard deviation values are close to 0 which tells that there is little volatility in the sample. Additionally, it is also found that the highest indicator for respondents is “Hotels use AI to improve productivity” where its mean value is **4.41** as 94.32 %. These results agree with Samset, (1998) Sufian, *et al.*, (2013) Olsson, (2017) Palmer and Torgerson, (2018) Ashtiani, *et al.*, (2019) Sattar, *et al.*, (2019). In summary, efficiency is the extent to which beneficial work is performed by a machine and the condition of producing the results you desire without wasting material, energy, effort, money, and time.

**Table (3): Descriptive Statistics for AI Ease of Use**

AI Ease of Use	Attitude	N	Mean	S. D	Percentage				
					SD	D	N	A	SA
The employee understands AI functions easily.	strongly agree	380	4.31	1.05	7.1		1.8	36.3	54.7
The employee effortlessly utilizes AI systems	strongly agree	380	4.24	1.02	7.1		.8	45.5	46.6
The employee uses AI to complete tasks with minimal supervision.	strongly agree	380	4.28	1.03	7.1		.8	41.1	51.1
The employee uses AI to achieve tasks easily.	strongly agree	380	4.38	1.05	7.1		.8	31.8	60.3

The employee uses AI to simplify complex tasks	strongly agree	380	4.35	1.05	7.1		1.8	32.9	58.2
Artificial intelligence provides accurate data and information	strongly agree	380	4.22	1.03	7.1		1.8	45.0	46.1
Artificial intelligence can help me in getting the job done.	strongly agree	380	4.30	1.04	7.1		1.8	37.9	53.2
I help shorten the waiting time for services.	strongly agree	380	4.30	1.04	7.1		1.8	37.9	53.2
mean	strongly agree	380	4.29						

(SD= strongly disagree, D= Disagree, N= Neutral, A= Agree, SA= strongly agree)

Results declared that variables' means choice from 4.38 to 4.30; with a grand mean of **4.29** which is near to the choice (5) “strongly agree”, this result indicates that strongly agree with the AI Ease of Use dimension. Most of the respondent's perception of the dimension of **AI** Ease of Use was acceptable as the grand mean (**4.29**), which means that respondents strongly agree with the dimension of AI Ease of Use and the standard deviations refer to accepted normality of data distribution, The standard deviation of the previous indicators illustrations that the researcher can rely on the mean to provide a meaningful representation of the data. As a standard deviation from 1.05 to 1.02 is not far off from the mean, indicating that a majority of data points are positioned close to the mean, The closer the standard deviation is to 0, the more reliable the mean is, More than that though, standard deviation values are close to 0 which tells that there is little volatility in the sample. On the other hand, it is also found that the highest indicator for respondents is “The employee uses AI to achieve tasks easily” where its mean value is **4.38** as 94.32 %. These results agree with Lee and Park, (2008) Jen and Hung, (2010) Lim, *et al.*, (2011), Jung and Yim, (2016), and Gursoy, *et al.*, (2019). In summary, ease of use is the degree to which an application can be easily understood and measured by users.

**Table (4): Descriptive Statistics for Quantity of Work**

Quantity of Work	Attitude	N	Mean	S. D	Percentage				
					SD	D	N	A	SA
AI helps to achieve a lot of tasks	strongly agree	380	4.39	1.05	7.1		.8	35.3	56.8
AI helps to reduce workload	strongly agree	380	4.46	1.05	7.1		.8	30.3	61.3
AI helps to save time	strongly agree	380	4.44	1.05	7.1		.8	23.2	68.9
mean	strongly agree	380	4.43						

(SD= strongly disagree, D= Disagree, N= Neutral, A= Agree, SA= strongly agree)

Results show that variables' means choice from 4.46 to 4.39; with a grand mean of **4.43** which is near to the choice (5) “strongly agree”, this result shows that strongly agree with the

quantity of work dimension. most of the respondents' perceptions of the dimension of quantity of work dimension were acceptable as the grand mean (4.43), which means that respondents strongly agree with the dimension of quantity of work dimension. And the standard deviations refer to the accepted normality of data distribution, the standard deviation of the previous indicators confirms that the researcher can rely on the mean to provide a meaningful representation of the data. A standard deviation from 1.05 is not far off from the mean, indicating that a majority of data points are positioned close to the mean. The closer the standard deviation is to 0, the more reliable the mean is. That though standard deviation values are close to 0 which tells that there is little volatility in the sample. On the other hand, it is also found that the highest indicator for respondents is “Artificial intelligence helps to reduce workload” where its mean value is 4.46 as 93.82 %. These results agree with (Berezina *et al.*, 2019), (Ivanov *et al.*, 2017; Drexler, Lapré, and Group, 2019; Lukanova and Ilieva, 2019). Ivanov and Webster, 2017), (Ivanov, S. 2019), (e.g., Forsgren, Durcikova, Clay, and Wang, 2016; Wixom and Todd, 2005), (Paterson and Maker, 2018), Peterson and Plowman, (1953), (Mathis and Jackson 2009), Breugh, (1981) Hunter, (1986), (Griffin *et al.*, 1981), (Lavanson, 2007).

**Table (5): Descriptive Statistics for Quality of Work**

Quality of Work	Attitude	N	Mean	S. D	Percentage				
					SD	D	N	A	SA
AI helps to achieve a larger number of tasks.	strongly agree	380	4.26	1.02	7.1			44.7	38.2
AI helps to achieve the work within the required specifications.	strongly agree	380	4.26	1.02	7.1			44.7	48.2
AI helps to improve work continuously	strongly agree	380	4.28	1.03					
mean	strongly agree	380	4.26						

(SD= strongly disagree, D= Disagree, N= Neutral, A= Agree, SA= strongly agree)

Results declared that variables' means choice from 4.28 to 4.26; with a grand mean of 4.26 which is near to the choice (5) “strongly agree”, this result indicates that strongly agree with the quality of work dimension. Most of the respondents' perceptions of the dimension of quality of work dimension were acceptable as the grand mean (4.26), which means that respondents strongly agree with the dimension of quality of work dimension. The standard deviations refer to the accepted normality of data distribution, the standard deviation of the previous indicators indicates that the researcher can rely on the mean to provide a meaningful representation of the data. A standard deviation from 1.03 to 1.02 is not far off from the mean, indicating that a majority of data points are positioned close to the mean. The closer the standard deviation is to 0, the more reliable the mean is, more than that though, standard deviation values are close to 0 which tells that there is little volatility in the sample. On the other hand, it is also found that the highest indicator for respondents is “Artificial intelligence helps to improve work continuously” where its mean value is 4.28 as 94.32 %. These results agree with (Berezina *et al.*, 2019), (Ivanov *et al.*, 2017; Drexler, Lapré, and Group, 2019; Lukanova and Ilieva, 2019), Ivanov and Webster, 2017), (Ivanov, S. 2019), (e.g., Forsgren, Durcikova, Clay, and Wang, 2016; Wixom and Todd, 2005) (Paterson and Maker, 2018)



Peterson and Plowman, (1953), (Mathis and Jackson 2009), (Breugh,1981) Hunter, (1986), Griffin *et al.*, (1981), Lavanson, 2007).

**Table (6): Descriptive Statistics for Speed of Work Achievement**

Speed of Work Achievement	Attitude	N	Mean	S. D	Percentage				
					SD	D	N	A	SA
Artificial intelligence helps to save time.	strongly agree	380	4.24	1.02	7.1			46.8	48.1
Artificial intelligence helps to provide effort.	strongly agree	380	4.40	1.04	7.1			30.8	62.1
Artificial intelligence helps to achieve greater flexibility in work.	strongly agree	380	4.41	1.04	7.1			30.8	62.9
mean	strongly agree	380	4.35						

(SD= strongly disagree, D= Disagree, N= Neutral, A= Agree, SA= strongly agree)

Results declared that variables' means choice from 4.40 to 4.24; with a grand mean of **4.35** which is near to the choice (5) “strongly agree”, this result indicates that strongly agree with the Speed of Work Achievement. Most of the respondents' perceptions of the dimension of speed of work achievement were acceptable as the grand mean (**4.35**), which means that respondents strongly agree with the dimension of Speed of Work Achievement. And the standard deviations refer to the accepted normality of data distribution, the standard deviation of the previous indicators confirms that the researcher can rely on the mean to provide a meaningful representation of the data. A standard deviation from 1.04 to 1.02 is not far off from the mean, indicating that a majority of data points are positioned close to the mean. The closer the standard deviation is to 0, the more reliable the mean is, more than that though, standard deviation values are close to 0 which tells that there is little volatility in the sample. On the other hand, it is also found that the highest indicator for respondents is “Artificial intelligence helps to achieve greater flexibility in work.” where its mean value is 4.41 as 95.12 %. These results agree with (Berezina *et al.*, 2019), (Ivanov *et al.*, 2017; Drexler, Lapré, and Group, 2019; Lukanova and Ilieva, 2019), Ivanov and Webster, 2017). (Ivanov, S. 2019), (e.g., Forsgren, Durcikova, Clay, and Wang, 2016; Wixom and Todd, 2005) (Paterson and Maker, 2018) (Peterson and Plowman, 1953), (Mathis and Jackson 2009), (Breugh, 1981) Hunter, (1986), (Griffin *et al.*, 1981), (Lavanson, 2007).

### Research questions Testing

The relation between Artificial intelligence automation on employees' performance dimensions (Quantity, Quality, and Speed of Work Achievement).

**Table (7): Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.737 <sup>a</sup>	.543	.542	.709

a. Predictors: (Constant), AI Automation

The result shows that, the R and R-square standards. The R-value is the correlation coefficient between Artificial intelligence automation and employees' performance dimension (quantity of work). (R=.737<sup>a</sup>) It specifies a strong positive correlation

between Artificial intelligence automation and employees’ performance dimension (quantity of work). The  $R^2$  value denotes the coefficient of determination which shows how much of the total variation in the dependent variable employees’ performance dimension (quantity of work), can be clarified by the independent variable artificial intelligence (automation). In this case, .543% of the dependent variable employees’ performance dimension (quantity of work) can be explained by artificial intelligence automation. This result reflects the good influence of artificial intelligence (automation) on employees’ performance dimension (quantity of work). That leads to validating the assumption that employees’ performance dimension (quantity of work) is transformed/ affected by the level of changes in artificial intelligence (automation) as independent variables. To test the impact of the (linear) relationship between Artificial intelligence automation as an independent variable and employees’ performance dimension (quantity of work) as a dependent, F- test can be used as exposed in the table (8)

**Table (8): F- test**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	225.799	1	225.799	449.342	.000 <sup>b</sup>
	Residual	189.949	378	.503		
	Total	415.748	379			
a. Dependent Variable: quantity of work						
b. Predictors: (Constant), AI Automation						

The ANOVA illustrates whether the regression model significantly predicts the employees’ performance dimension (quantity of work). From table (8), it is clear that  $F_{1, 378} = 449.342$  and  $P < 0.01$ , and this means that there is a significant connection between (automation) and employees’ performance dimension (quantity of work). The relation between Artificial intelligence automation on employees’ performance dimensions (quantity, quality, and speed of work achievement).

**Table (9): Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.636 <sup>a</sup>	.405	.403	.792
a. Predictors: (Constant), AI Automation				

The result in the table (9) shows that, the R and R-square standards. The R-value is the correlation coefficient between artificial intelligence automation and employees’ performance dimension (quality of work). ( $R = .636^a$ ) It shows a strong positive correlation between artificial intelligence automation and employees’ performance dimension (quality of work). The  $R^2$  value mentions the coefficient of determination which shows how much of the total variation in the dependent variable employees’ performance dimension (quality of work), can be explained by the independent variable artificial intelligence (automation). In this case, .405% of the dependent variable employees’ performance dimension (quality of work) can be explained by artificial intelligence automation. This result reflects the good effect of artificial intelligence (automation) on employees’ performance dimension (quality of work). That leads to validating the assumption that employees’ performance dimension (quality of work) is transformed/ affected by the level of changes in Artificial intelligence (automation) as independent variables. To test the impact of the (linear) relationship between artificial intelligence automation as an independent variable and employees’ performance dimension (quality of work) as a dependent, F- the test can be used as shown in table (10).

**Table (10): Model Summary**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	161.161	1	161.161	257.152	.000 <sup>b</sup>
	Residual	236.899	378	.627		
	Total	398.060	379			
a. Dependent Variable: quality of work						
b. Predictors: (Constant), AI Automation						

**Table (11): correlations between the dependent variable (employees’ performance) and independent variable (AI Automation).**

Correlations					
		quantity of work	quality of work	speed of work	AI Automation
quantity of work	Pearson Correlation	1	.784**	.867**	.737**
	Sig. (2-tailed)		.000	.000	.000
	N	380	380	380	380
quality of work	Pearson Correlation	.784**	1	.818**	.636**
	Sig. (2-tailed)	.000		.000	.000
	N	380	380	380	380
speed of work	Pearson Correlation	.867**	.818**	1	.674**
	Sig. (2-tailed)	.000	.000		.000
	N	380	380	380	380
AI Automation	Pearson Correlation	.737**	.636**	.674**	1
	Sig. (2-tailed)	.000	.000	.000	
	N	380	380	380	380

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

After studying the previous table, the results in a table (11) show that the dependent variables, employees' performance dimensions, have a very high statistical significance of less than or equal to 0.000, note that (quantity of work, speed of work) are strongly correlated and (quality of work) are less correlated than (AI Automation). By Using simple linear regression analysis, the data revealed a statistically significant impact of the independent variable artificial intelligence automation on employee performance dimensions (sig = 0.000, P0.01). It means that artificial intelligence (automation) has an impact on the performance extents of employees (quantity, quality, and speed of work achievement). These findings are consistent with Rifkin (1995), Tzafestas (2009), Groover (2014), Altemeyer (2019), Wang and Siau, and others (2019). To summarize, automation is the use of machines and technology to create processes that run on their own without the essential human intervention. It entails using control systems to run equipment and applications with minimal human intervention. The result shows that, the R and R-square standards. The R-value is the correlation coefficient between Artificial intelligence Efficiency and employees’ performance dimension (quantity of work). (R=.924<sup>a</sup>) It shows a strong positive correlation between Artificial intelligence automation and employees’ performance dimension (quantity of work). The R2 value denotes the coefficient of determination which indicates how much of the total variation in the dependent variable employees’ performance dimension (quantity of work), can be described by the independent variable artificial intelligence (efficiency). In this case, .854% of the dependent variable employees’ performance dimension (quantity of work) can be explained by artificial intelligence efficiency. This result reflects the good impact of Artificial intelligence (Efficiency) on employees’ performance dimension (quantity of work). That leads to validating the assumption that employees’ performance dimension (quantity of

work) is transformed/ affected by the level of changes in Artificial intelligence (Efficiency) as independent variables.

The result shows that, the R and R-square standards. The R-value is the correlation coefficient between Artificial intelligence Efficiency and employees' performance dimension (Quality of Work). (R=.782<sup>a</sup>) It specifies a strong positive correlation between Artificial intelligence Efficiency and employees' performance dimension (Quality of Work). The R<sup>2</sup> value refers to the coefficient of purpose which indicates how much of the total variations in the dependent variable employees' performance dimension (Quality of Work), Can be explained by the independent variable Artificial intelligence (Efficiency). In this case, .543% of the dependent variable employees' performance dimension (Quality of Work) can be explained by Artificial intelligence automation. This result reflects the good effect of Artificial intelligence (Efficiency) on employees' performance dimension (Quality of Work). That leads to validate the assumption that employees' performance dimension (Quality of Work) is transformed/ affected by the level of changes in Artificial intelligence (Efficiency) as independent variables.

The R-value is the correlation coefficient between Artificial intelligence Efficiency and employees' performance dimension (speed of work). (R=.861<sup>a</sup>) It shows a strong positive correlation between Artificial intelligence automation and employees' performance dimension (speed of work). The R<sup>2</sup> refers to the coefficient of determination which specifies how much of the total variation in the dependent variable employees' performance dimension (speed of work), Can be explained by the independent variable Artificial intelligence (Efficiency). In this case, .543% of the dependent variable employees' performance dimension (speed of work) can be clarified by Artificial intelligence automation. This result reflects the good effect of Artificial intelligence (Efficiency) on employees' performance dimension (speed of work). That leads to validating the assumption that employees' performance dimension (speed of work) is transformed/ affected by the level of changes in Artificial intelligence (Efficiency) as independent variables.

**Table (12): correlations between the dependent variable (employees' performance dimension) and independent variable (AI efficiency).**

Correlations					
		quantity of work	quality of work	speed of work	AI Efficiency
quantity of work	Pearson Correlation	1	.784**	.867**	.924**
	Sig. (2-tailed)		.000	.000	.000
	N	380	380	380	380
quality of work	Pearson Correlation	.784**	1	.818**	.782**
	Sig. (2-tailed)	.000		.000	.000
	N	380	380	380	380
speed of work	Pearson Correlation	.867**	.818**	1	.861**
	Sig. (2-tailed)	.000	.000		.000
	N	380	380	380	380
AI Efficiency	Pearson Correlation	.924**	.782**	.861**	1
	Sig. (2-tailed)	.000	.000	.000	
	N	380	380	380	380

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

The results show that, after studying the previous table, note that the dependent variables, employees' performance dimensions (Quantity, Quality, and Speed of Work Achievement), Have a very high statistical significance of less than or equal to 0.000, note that (quantity of work, AI Efficiency) are strongly correlated and (quality of work) are less correlated then, (speed of work) are less correlated. By Using simple linear regression analysis, the data

revealed a statistically significant impact of the independent variable artificial intelligence efficiency on employee performance dimensions (sig = 0.000, P 0.01), It means that artificial intelligence (efficiency) has an impact on the performance extents of employees (Quantity, Quality, and Speed of Work Achievement), These findings are consistent with those of Samset (1998), Sufian, *et al.*, (2013) Olsson, (2017) Palmer and Torgerson, (2018) Ashtiani *et al.*, (2019) Sattar et al (2019). In summary, efficiency is the extent to which a machine achieves useful work and the condition of producing the desired results without wasting material, energy, effort, money, or time.

The R-value is the correlation coefficient between Artificial intelligence Ease of use and employees' performance dimension (quantity of work). (R=.941<sup>a</sup>) It shows a strong positive correlation between Artificial intelligence Ease of use and employees' performance dimension (quantity of work). The R<sup>2</sup> value mentions the coefficient of determination which shows how much of the total variation in the dependent variable employees' performance dimension (quantity of work), Can be explained by the independent variable Artificial intelligence (Ease of use). In this case, .886% of the dependent variable employees' performance dimension (quantity of work) can be explained by Artificial intelligence automation. This result reflects the good influence of Artificial intelligence (Ease of use) on employees' performance dimension (quantity of work). That leads to validating the assumption that employees' performance dimension (quantity of work) is transformed/ affected by the level of changes in Artificial intelligence (Ease of use) as independent variables. To examine the impact of the (linear) relationship between Artificial intelligence Ease of use as the independent variable and employees' performance dimension (quantity of work) as a dependent, F- test can be used

The R-value is the correlation coefficient between Artificial intelligence Ease of use and employees' performance dimension (Quality of work). (R=.791<sup>a</sup>) It indicates a strong positive correlation between Artificial intelligence Ease of use and employees' performance dimension (Quality of work).

The R<sup>2</sup> value mentions the coefficient of determination which indicates how much of the total variation in the dependent variable employees' performance dimension (Quality of work), Can be explained by the independent variable Artificial intelligence (Ease of use). In this case, .626% of the dependent variable employees' performance dimension (Quality of work) can be explained by Artificial intelligence automation. This result reflects the good influence of Artificial intelligence (Ease of use) on employees' performance dimension (Quality of work). That leads to validating the assumption that employees' performance dimension (Quality of work) is transformed/ affected by the level of changes in Artificial intelligence (Ease of use) as independent variables.

The result shows that, the R and R-square standards. The R-value is the correlation coefficient between Artificial intelligence Ease of use and employees' performance dimension (speed of work). (R=.883<sup>a</sup>) It indicates a strong positive correlation between Artificial intelligence Ease of use and employees' performance dimension (speed of work). The R<sup>2</sup> value denotes the coefficient of determination which specifies how much of the total variation in the dependent variable employees' performance dimension (speed of work), Can be explained by the independent variable Artificial intelligence (Ease of use). In this case, .779% of the dependent variable employees' performance dimension (speed of work) can be explained by Artificial intelligence automation. This result reflects the good influence of Artificial intelligence (Ease of use) on employees' performance dimension (speed of work). That leads to validating the assumption that employees' performance dimension (speed of work) is transformed/ affected by the level of changes in Artificial intelligence (Ease of use) as independent variables.

To examine the impact of the (linear) relationship between Artificial intelligence Ease of use as an independent variable and employees’ performance dimension (speed of work) as a dependent, F- test Table (10.3) all coefficients are not equal to zero, implying that we can still reject the null hypothesis where t for x1= 36.538, P0.01 for x variables, It is also obvious that =.533 and 1=.889, so: According to the regression model (10.3), there was a significant effect of artificial intelligence (Ease of use) as an independent variable on employee performance dimension (speed of work) as a dependent variable, The table also explains why and how Artificial Intelligence Ease of Use had a positive effect on employees' performance (speed of work).

**Table (13): correlations between the dependent variable (employees’ performance dimension) and the dependent variable (ai ease of use)**

Correlations					
		quantity of work	quality of work	speed of work	ai ease of use
quantity of work	Pearson Correlation	1	.784**	.867**	.941**
	Sig. (2-tailed)		.000	.000	.000
	N	380	380	380	380
quality of work	Pearson Correlation	.784**	1	.818**	.791**
	Sig. (2-tailed)	.000		.000	.000
	N	380	380	380	380
speed of work	Pearson Correlation	.867**	.818**	1	.883**
	Sig. (2-tailed)	.000	.000		.000
	N	380	380	380	380
ai ease of use	Pearson Correlation	.941**	.791**	.883**	1
	Sig. (2-tailed)	.000	.000	.000	
	N	380	380	380	380

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

The results in a table (13) show that, after studying the previous table, the dependent variables, employees' performance dimensions (Quantity, Quality, and Speed of Work Achievement), have a very high statistical significance of less than or equal to 0.000, and that (quantity of work, ai ease of use) are strongly correlated and (speed of work) are less correlated than (quality of work). According to simple linear regression analysis, the data revealed a statistically significant impact sig = 0.000, P 0.01 of the independent variable artificial intelligence efficiency on employee performance dimensions, implying that (Ease of use) has an impact on employee performance dimensions (Quantity, Quality, and Speed of Work Achievement). These findings are consistent with those of Lee and Park (2008), Jen and Hung (2010), Lim et al. (2011), Jung and Yim (2016), and Gursoy et al (2019). In summary, ease of use is the degree to which a user can understand and control an application.

**Conclusion and Future Research**

Smart technology is becoming increasingly important in the tourism industry, particularly in light of recent advances in data and communication technology and the use of artificial intelligence techniques in a variety of fields, including tourism. The purpose of the research is to explore “The Impact of artificial intelligence and employees’ performance in the hotel sector. The data collection instrument was a questionnaire that was validated for its validity and reliability. Then, simple linear regressions and bivariate Pearson Correlation were used to demonstrate the relationship between the study's variables, which included independent variables related to artificial intelligence and dependent variables related to employee performance. The weighted average of the samples answers the questions contained in a form

similar to the (five Likert –scale) to know the direction of the respondents' opinions (Attitude).

This research was conducted in five-star hotels in Greater Cairo, Egypt; to specify the current research results, it is recommended that such a study be conducted on the same industry in other countries, particularly Arab countries because they have similar social and cultural lifestyles. Because this research was conducted in five-star hotels in Greater Cairo, Egypt, it is recommended that the same variables be applied to other sectors such as Fast food restaurants. Academic research on the application of RAISA in hotels is still relatively limited, which opens up several avenues for future research, such as how different generations (guests and employees) perceive RAISA in the hotel industry, how guests in different hotel categories (luxury and economy) perceive the use of RAISA, and what types of robots (androids or machines) are more appropriate for different types of hotel operations.

## References

- Altemeyer, B. (2019). Making the business case for AI in HR: two case studies. *Strategic HR Review*, 18 (2), 66-70.
- Arntz, M., Gregory, T., and Zierahn, U. (2016). *The risk of automation for jobs in OECD countries: a comparative analysis*, Paris: OECD Publishing.
- Ashtiani Abdi, A., Nour Mohammadi, F., Mohammadi, Y., and Saeb, M. R. (2019). Control over power conversion efficiency of bhj solar cells: learn more from less, with artificial intelligence. *Progress in Color, Colorants and Coatings*, 12 (1), 1-14.
- Cappelli, P., Tambe, P., and Yakubovich, V. (2019). Artificial intelligence in human resources management: challenges and a path forward. *Available at SSRN 32, 63878*.
- Deloitte, (2016). The state of the state 2016–17: Brexit and the business of government. London: Deloitte.
- Fedorov, A., Koropets, O., and Gatti, M. (2019, May). Digitalization of human resource management practices and its impact on employees' well-being. *International Scientific Conference "Contemporary Issues in Business, Management, and Economics Engineering"*.
- Finn, M, Eiliott, M and Walton, M. (2000) *Tourism and Leisure Research Methods Data Collection analysis and interpretation*, Pearson Education, Malaysia, 2nd Edition.
- Frontier economics, (2018). *The Impact of Artificial Intelligence on Work: An evidence synthesis on implications for individuals, communities, and societies*. London, Frontier Economics network.
- Gonczi, A., *Competency-based assessment in the professions in Australia. Assessment in Education: Principles, Policy & Practice*, 1994. 1(1): p. 27-44
- Gray, D. E. (2013). *Doing research in the real world*. Sage.
- Groover, M.P. (2014). *Fundamentals of modern manufacturing: materials, processes, and systems*. New Jersey: John Wiley & Sons.
- Gursoy, D., Chi, O. H., Lu, L., and Nunkoo, R. (2019). Consumers' acceptance of artificially intelligent (AI) devices use in service delivery. *International Journal of Information Management*, 49, 157-169.
- Ivanov, S. (2017). Robonomics – principles, benefits, challenges, solutions. *Yearbook of Varna University of Management*, 10, 283-293.
- Ivanov, S., Webster, G., and Garenko, A. (2018). Young Russian adults' attitudes towards the potential use of robots in hotels. *Technology in Society*, 55, 24–32.

- Jackson, P. C. (2019). *Introduction to artificial intelligence*. Courier Dover Publications.
- Jen, Y.W., and Hung, C.M. (2010). An Empirical Study of Adopting Mobile Healthcare Service: The Family's Perspective on the Healthcare Needs of Their Elderly Members. *TELEMEDICINE and eHEALTH JOURNAL*, 16 (1), 41-48.
- Jung, W., and Yim, H. (2016). Effects of Mental Model and Intrinsic Motivation on Behavioral Intention of Smartphone Application Users. *ETRI Journal*, 38 (3), 589-598.
- Lee, M.T., and Park, C. (2008). Mobile technology usage and B2B market performance under mandatory adaption. *Industrial marketing management*, 37 (7), 833-840.
- Lim, S. Xue, L. Yen, C.C. Chang, L., Chan, C.H., Tai, C.B., Duh, B.H. and Choolani, M. (2011). A study on Singaporean women's acceptance of using mobile phones to seek health information. *International Journal of Medical Informatics*, 80 (20), 189-202.
- Messick, S., The psychology of educational measurement. ETS Research Report Series, 1984. 1984(1): p. i-55.
- Mwitwa, J. I. (2000). "Performance management model: A systems-based approach to public service quality". *International Journal of Public Sector Management*. Vol 13, 19-37.
- Na-Nan, K., Chaiprasit, K. and Pukkeeree, P. (2018), "Factor analysis-validated comprehensive employee job performance scale", *International Journal of Quality and Reliability Management*, Vol. 35 No. 10, pp. 2436-2449.
- Nunn, J. (2019). The Emerging Impact of AI on HR. Accessed from <https://www.forbes.com/sites/forbestechcouncil/2019/02/06/theemerging-impact-of-ai-on- r/#6d23a2ca5496> accessed on 20.03.19
- Olsson, N.O., and Zidane, Y.J. (2017) Defining project efficiency, effectiveness, and efficacy. *International Journal of Managing Projects in Business*, 4 (2), 308–328.
- Palmer, S., and Torgerson, D. J. (2018). Definitions of efficiency. *BMJ*, 318 (7191), 1136.
- Parveen, N. A., and Palaniammal, V. S. (2019). A STUDY ON ARTIFICIAL INTELLIGENCE IN HUMAN RESOURCE MANAGEMENT TODAY AND TOMORROW. *International Journal of Research and Analytical Reviews (IJRAR)*, 6 (1), 513-516.
- Peterson, E. and Plowman, G.E. (1953), *Business Organization and Management*, Irwin, IL.
- Prasanna Matsa, Kusuma Gullamajji (2019) To Study Impact of Artificial Intelligence on Human Resource Management. *International Research Journal of Engineering and Technology (IRJET)*, Volume: 06 Issue: 08.
- Rifkin, J. (1995). *The end of work: the decline of the global labor force and the dawn of the post-market era*, New York: G. P. Putnam's Sons.
- Russell, S. J., and Norvig, P. (2016). *Artificial intelligence: A modern approach*. Malaysia: Pearson Education Limited
- Samset, K. (1998). *Project management in a high-uncertainty situation: understanding risk and project management in international development projects*, (Unpublished doctoral dissertation), Norwegian University of Science and Technology, Trondheim.



- Sattar, A. A., Elhakeem, M., Rezaie-Balf, M., Gharabaghi, B., and Bonakdari, H. (2019). Artificial intelligence models for prediction of the aeration efficiency of the stepped weir. *Flow Measurement and Instrumentation*, 65, 78-89.
- Sufian, F., Kamarudin F., and Noor M. H.N. (2013) Assessing the revenue efficiency of domestic and foreign Islamic banks: empirical evidence from Malaysia, *Journal Pengurusan*, 37 (1), 77 – 90.
- Wang, W., and Siau, K. (2019). Artificial Intelligence, Machine Learning, Automation, Robotics, Future of Work and Future of Humanity: A Review and Research Agenda. *Journal of Database Management (JDM)*, 30 (1), 61-79.

### الملخص العربي

## إعادة تأهيل الموارد البشرية في قطاع الفنادق المصري من خلال تطوير مهارات الذكاء الاصطناعي

يعد الذكاء الاصطناعي هو أحدث اتجاه في التكنولوجيا يتم تطبيقه أكثر فأكثر في حياتنا اليومية. وبالتالي يتم استخدام الذكاء الاصطناعي في العديد من المجالات لذلك يعتبر التوظيف من أهم المجالات التي تستفيد من هذه التقنيات. من ناحية أخرى، فإنه يهدد باستبدال الوظائف. علاوة على ذلك تطبق تقنيات الروبوتات (R) والذكاء الاصطناعي (AI) وأتمتة الخدمات (RAISA) (SA) بشكل كبير في صناعة السياحة والضيافة في جميع أنحاء العالم. البحث في هذا المجال يكتسب أهمية كبيرة، ولكن التحقيق في صناعة السياحة والضيافة المصرية قد تم إهماله إلى حد ما، لذلك هناك ندرة وقلة في الدراسات التي تناولت مكونات الذكاء الاصطناعي وأداء العاملين في قطاع الفنادق، حيث يهدف البحث إلى دراسة تأثير مكونات الذكاء الاصطناعي على أداء العاملين في قطاع الفنادق، تم جمع البيانات من المديرين والعاملين في فنادق الخمس نجوم في مدينة القاهرة الكبرى في مصر، بينما تم جمع البيانات الأولية من خلال دراسة تجريبية أجريت بواسطة أداة الاستبيان على عينة ملائمة للعاملين والمديرين في الفنادق، تم جمع بيانات ثانوية من الدراسات المتعلقة بالذكاء الاصطناعي وأداء العاملين، لتحليل البيانات تم إجراء التحليل و اختبار التأثير من خلال الانحدار الخطي البسيط باستخدام (SPSS25). وتظهر النتيجة أن قطاع الفنادق يستخدم الذكاء الاصطناعي ولكن بشكل أقل، كما يوضح البحث أن هناك علاقة تأثير وتأثر بين مكونات الذكاء الاصطناعي وأبعاد أداء العاملين. أخيرًا، تشير النتائج إلى وجود تأثير كبير للذكاء الاصطناعي الكلي على إجمالي أداء العاملين في قطاع الفنادق حيث كانت الكفاءة أعلى تأثير على أداء العاملين، تليها سهولة الاستخدام، بينما لا تظهر الأتمتة تأثيرًا كبيرًا على أبعاد أداء العاملين في قطاع الفنادق. وأكدت النتائج عدم وجود تطبيقات للروبوتات في القطاع الفندقي المصري. ويقترح البحث إجراء دراسات مماثلة في قطاعات أخرى في مصر وكذلك في نفس القطاع خارج مصر لاختبار قابلية تعميم نتائجها، لذلك يمكن اعتبار هذا البحث واحدة من الدراسات القليلة التي تناقش تأثير الذكاء الاصطناعي على أداء العاملين في الفندق.

الكلمات الرئيسية: الذكاء الاصطناعي، أداء العاملين، الفنادق، مصر