Mansoura University
Faculty of Tourism and Hotels

The influence of big data analytics on hotel performance efficiency in Egyptian hotels

By

Dr OMAR NOBY
Faculty of Tourism and Hotels
, Luxor University, Egypt

Dr. AHMED RADY
Faculty of Tourism and Hotels
, Minia University, Egypt

Dr. SABREEN GABER ABD ELJALIL
Faculty of Tourism and Hotels
, Luxor University, Egypt

RESEARCH JOURNAL OF THE FACULTY OF TOURISM AND HOTELS
MANSOURA UNIVERSITY
ISSUE NO. 11 (PART 2), JUNE. 2022

ABSTRACT

Using Big Data Analytics (BDA) in organizations has the potential to improve innovation, accuracy, and efficiency. Therefore, this research will focus on exploring the influence of big data analytics on hotel performance efficiency in Egyptian hotels. This Research developed all measurements using scales suggested by previous authors. The current research utilized the quantitative approach. A five-point Likert scale was used to test the attitude of the participators toward research variables. Participators shared in this survey are hotel' employees in hotel chains and five-star hotels in the governorates of Luxor, Aswan, the Red Sea, and Sharm El-Sheikh city, and they number 397 employees. Data collected were analyzed using SPSS (23) statistical tool. The research found that, hotels need to validate the data collected before analyzing it, using BDA has the potential to improve innovation, accuracy in hotels, using BDA helps to increase the effectiveness and efficiency of hotel employees and hotel performance. On the other hand, some of the challenges that hotels face in using BDA: the high cost of using BDA applications, the difficulty of data security, and the difficulty of storing data.

KEYWORDS: Big Data (BD), Big Data Analytics (BDA), Hotel performance efficiency, Hotel employees.

INTRODUCTION

The massive technology waves and the magnitude of data generated resulted in the Big Data (BD) revolution and data

analytics adoption in present-day organizations (Manohar, 2020). Hence, using BD in organizations has the potential to improve innovation, accuracy, and efficiency (Hylving and Lindberg, 2021). Meanwhile, organizations have an opportunity to excel if they successfully manage to make sense of this newly produced knowledge and thus extract value from BDA (Björkman and Franco, 2017).

From a strategic perspective, Hylving and Lindberg (2021), called for exploring the challenges of BDA. Therefore, this research aims to explore the effect of BDA on hotel performance at five stars' hotels and chains. Furthermore, to explore the difficulties that face hotel employees of five stars' hotels and chains to apply BDA.

LITERATURE REVIEW

During the last few years, the terms BD and BDA have grown increasingly essential for academic and commercial professionals in IT-related domains and other disciplines (Thirathon *et al.*, 2017). It is noteworthy to mention from a business perspective, data is now viewed as the new gold. This is the era of BD (Blazquez and Domene, 2018). Furthermore, one of the latest Euromonitor International travel industry reports confirms that BDA is expected to be the most influential technology impacting the industry in the next five years, followed by Artificial Intelligence (AI) and the Internet of Things (Yallop and Seraphin, 2020).

BIG DATA ANALYTICS

BD is a term for a set of data that are so huge and composite that existing data handling applications are insufficient (Osman, 2019). On the other side, BDA refers to the process of collecting, analyzing, and organizing a large set of data to find patterns and useful information (Joshi and

Patel, 2019). Meanwhile, BDA help in processing a large amount of data parallel and also helps in providing a solution to various hidden problems (Kulkarni *et al.*,2020). Consequently, BDA is a popular approach that many businesses are implementing. The analytics process encompasses the deployment and use of business intelligence (BI) solutions to boost operational efficiency, generate new income, and gain a competitive edge over competitors (Karthikeyan and Benjamin, 2019).

But, to deliver on BDA's potential, you also need refiners: people with the skills to use those tools to turn insight into decisive action. With the right tools and the right people, the value of BDA will flow (Song and Zhu, 2016). As the number of BDA based products and services increases, the demand for qualified BDA professionals is ever-increasing over time (Gurcan, 2019). On the other side, according to studies, the most significant impediments to the BDA phenomena are a shortage of qualified people and a lack of expertise. (Miller, 2014).

BIG DATA AS A DRIVER FOR COMPETITIVE ADVANTAGE

The BD is the most prominent paradigm nowadays. The BDA starts to rule slowly from 2003, and it is expected to rule and dominate the IT industries for at least up to 2030 (Patgiri and Ahmed, 2016). Furthermore, BDA for governance and for competitive advantage is going to get the big push in 2020 and beyond (Prabhu *et al.,* 2019). Because of the strong rivalry in today's volatile market, many businesses are implementing cutting-edge information technology to gain a competitive advantage (Low *et al.,* 2011). It provides firms with new ways to exploit information and create a competitive advantage (Ur

Rehman *et al.,* 2019). However, BDA adoption enhances productivity, predicts risk, and satisfies customers more effectively (Al-Qirim *et al.,* 2017). In general, they established that utilizing BDA can enhance overall operational efficiency and strategic potentials, and establish new techniques to increase revenue and competitive advantages (Papadopoulos *et al.,* 2017). In contrast, adoption of BDA may be difficult with a large budget, but the long-term benefits may pave the way for long-term success (Al-Qirim *et al.,* 2017).

THE EFFICIENCY OF HOTEL PERFORMANCE

Performance is the time test of any strategy and strategic management is all about improving performance (Sainaghi and Baggio, 2021). Whereas The hotel performance concept represents the following points according to Chmatoo (2016): **1)** Performance is the specialty of individuals or groups in the hotel. **2)** Accomplishing the objectives of the hotel. **3)** Evaluating employee results. **4)** Achieving the hotel's economic goals.

Performance in the public sector is about the value an organization creates for its stakeholder groups (Zheng *et al.,* 2019). Furthermore, efficiency is one of the most important aspects of management control and a requirement for improving hotel performance (Poldrugovac *et al.,* 2016). Meanwhile, efficiency represents the relationship between inputs and outputs during operation. Reliable efficiency assessment is a prerequisite for effective strategic decision-making and sustainable planning (Luo *et al.,* 2014). Hence, employee Performance is a measure of efficiency and effectiveness of employees relative to their job (Ugwu *et al.,* 2018).

MEASURING HOTEL PERFORMANCE

Moreover, based on a literature analysis and business practice experience, it can be determined that monitoring hotel performance requires a three-pronged strategy (Ćorluka *et al.*, 2017):

- **Internal component of hotel performance:**

  Internal environment of hotel performance refers to the structure, culture, resources, strategies, processes, systems, products, or the role and responsibility of individuals (Ćorluka *et al.*, 2017).

- **External component of hotel performance:**

  External environment of the hotel company refers to the market and the industry in which it operates (Poldrugovac *et al.*, 2016).

- **Temporal component of hotel performance:**

  The hotel product, as well as other tourist products, has a character of seasonality. The seasonal product meets the seasonal demand, which varies according to the needs, motives and habits by seasons, which leads to the conclusion that tourists are looking for different benefits of the tourism product through the seasons (Yang *et al.*, 2017).

BIG DATA ANALYTICS CHALLENGES IN THE HOSPITALITY INDUSTRY

At first glance, BDA allows companies to gather large amounts of information about customers, possible customers, patients, gamers, and criminals; however, BDA raises concern when it comes to who owns the data, and who has rights to the data (Cole *et al.*, 2015). Moreover, the

budget of the initial and overall investment both impact an organization's intention to adopt BDA; the cost of adopting BDA might therefore be a serious challenge for many firms (Sun *et al.,* 2018). Organizations are anticipating greater challenges as data continues to rise at an exponential rate (Zhao *et al.,* 2019). These challenges could be related to security, privacy, and ownership of data (Osman, 2019). Moreover, BDA presents a diverse and difficult set of challenges. The challenge begins with data collection, storage, and analysis, with far greater complexity in search, sharing, and transfer, visualization, querying, and updating, as well as data privacy with the data source (Karthikeyan and Benjamin, 2019).

According to Al-Aklabi (2018); Abou El Dahab and Mahgoop (2020), There are many challenges and difficulties that organizations face as they work with BDA, the most important of these challenges can be summarized as follows:

- The ever-increasing volume of BD.
- The growth is tremendous and an accelerating amount of data.
- Random search and retrieval within BD.
- Data diversity.
- Availability Personnel specialized in BD analysis.
- Availability of automated systems that suit the needs of an organization.

Research Methodology

The research was based on the quantitative method to explore the influence of big data analytics on hotel performance efficiency in Egyptian hotels.

The questionnaire was created based on the literature and observations of reviewers. The questionnaire was split into two sections; section one is about private data. The second section is made up of five components, including; **(1)** big data analytics in hotels (13 items), which was adapted and revised from previous studies (Sun *et al.*, 2018; Ali, 2020; Amirhom,2020). **(2)** The hotel performance efficiency (7 items), a scale of (Kasab, 2021) was used to measure the hotel performance in hotels. **(3)** Attitudes and behaviors of employees towards big data in hotels (4 items), it was adapted and revised from previous researches (Al-Qirim *et al.*, 2017; Pugna *et al.*, 2019). **(4)** Challenges of applying big data analytics in hotels (5 items), it was adapted and revised from previous researches (Blazquez and Domene, 2018).

Moreover, the researchers used the Thompson formula (Thompson, 2012), to determine the appropriate sample size of the hotels and hotel chains' employees in the study population, as follows:

$$n = \frac{z^2 \times \hat{p}(1-\hat{p})}{\varepsilon^2}$$

$$n = \frac{1.96^2 \times 0.5(1-0.5)}{0.05^2} = 384.16$$

Where: **Z**: standard degree (1.96 at significant level of 0.05)**.** $\hat{p}$: sample proportion and neutral = 0.50 **e**: maximum allowed error (0.05 at significant level of 0.05). **n**: appropriate sample size (385).

When these values are entered into the Steven K. Thompson formula, it is revealed that, the appropriate

sample size for this research is 385 participants, the researchers distributed 450, 53 questionnaires were found to be ineligible for analysis; the valid is (397). The questionnaire was used to collect primary data and was distributed to hotel employees in hotel chains and five-star hotels in Sharm El-Sheikh city and the governorates of Luxor, Aswan, and the Red Sea in Egypt. Finally, the scale was examined by 12 academic reviewers and 7 hotel industry expert arbitrators for face validity.

Because all of the scales were created in English langauge, the researchers had to translate them into Arabic langauge to guarantee that the meaning was accurate. The five demographic variables included age, educational level, years of experience, department, and hotel type. Of the employees, 70.5% are between 20 and 40 years old, 51.1% of the participators are university qualifications, 33.8% have more than 10 years of experience and 56.9% of the participators from hotel chains.

THE RESEARCH HYPOTHESES

The research will examine the following hypotheses in order to fulfill the research's overall goal:

H1: There are no statistically significant differences between the hotel departments in terms of applying BDA at a significance level of 0.05

H2: There is no statistically significant effect of drivers for applying BDA on the efficiency of hotel performance at a significance level of 0.05

H3: There is no statistically significant effect of attitudes and behaviors of employees towards BD on the easiness of applying BDA in hotels at a significance level of 0.05

H4: There is no statistically significant effect of the challenges of implementing BDA on the efficiency of hotel performance at a significance level of 0.05

FINDINGS

VALIDITY AND RELIABILITY

Table 1: Factor analysis of research variables

Factor	Extraction
Factor analysis of Drivers for applying BDA in hotels variable	
Every day I deal with a large variety of big data from different sources, so I need to apply big data analysis to easily analyze it.	.441
My manager assigns me to periodically follow up on guests' opinions about the hotel on social media (Facebook, Twitter, Instagram... etc).	.681
I prepare the required reports with statistics, eg (guests' opinions about the hotel) so I need to apply big data analytics to easily prepare them.	.713
I need to validate the data I collect before analyzing it and presenting it to my boss.	.641
Factor analysis of Easiness applying BDA in hotels variable	
I collect supplier data from various sources.	.763
I collect employee data from various sources.	.795
Factor	**Extraction**
I collect data about hotel guests from various sources.	.603
I collect data on tourism companies from various sources.	.676
I analyze the data collected from various sources.	.521
Factor analysis of Perceived Usefulness from applying BDA in hotels variable	
Big data analytics helps me identify changes in the market, and how to adapt to them.	.539
Big data analytics helps me meet the wants and needs of the guests.	.673
Big data analytics helps me prepare the required reports supported by official statistics and predict what is coming.	.621

Big data analytics helps me in communicating and quickly circulating reports with my colleagues in other departments of the hotel.	.612
Factor analysis of the hotel performance efficiency variable	
I have a clear vision of the work I do and how it relates to the goals of the hotel.	.498
A manager takes responsibility for his actions and decisions and doesn't blame me.	.735
My manager is objective when allocating tasks without being influenced by personal considerations.	.744
I respond to requests for support and assistance to my colleagues in other departments of the hotel.	.605
I care about performing the work assigned to me without the guidance of my manager.	.678
I stick to working hours and make sure to be present when needed at the hotel.	.646
The hotel is constantly training me to keep pace with technological development.	.688
Factor analysis of attitudes and behaviors of employees towards big data in hotels variable	
I have prior knowledge of big data analytics	.691
I seek to participate in making decisions in the department in which I work in the hotel.	.648
I am interested in reading all that is new in the hotel business, and I try to implement it in my hotel.	.684
I am always keen to develop myself to keep pace with technological development.	.622
Factor analysis of challenges of applying big data analytics in hotels variable	
I do not have previous experience in dealing with big data analytics.	.721
The hotel does not provide a strong infrastructure that allows the use of BDA.	.794
One of the challenges of implementing big data analytics in the hotel is the continuous growth of the volume of big data.	.676

One of the challenges of implementing BDA in the hotel is the difficulty of storing data.	.663
Data security (electronic attacks) is one of the challenges of applying big data analytics in the hotel.	.666

From the previous table, all factor analysis scores ranged between 0.602 and 0.79 (> 0.6) suggesting that all elements are statistically acceptable (Basheer, 2003). Except 4 elements that have a loading coefficient less than 0.6, the researchers removed them from the analysis.

Table 2: Reliability analysis of the independent variables used in questionnaire

The Axis	**No. of statements**	**Alpha Coefficient**
Big Data Analytics in Hotels	10	0.869
The Hotel Performance Efficiency	6	0.771
Attitudes and behaviors of employees towards big data in hotels	4	0.749
The Axis	**No. of statements**	**Alpha Coefficient**
Challenges of applying big data analytics in hotels	5	0.816
Total	**25**	**0.882**

From the previous table, all of the research variables had Cronbach's α values more than 0.882, indicating sufficient measurement reliability, according to Hair *et al.,* (2010), Cronbach's α values greater than 0.7 are considered good for reliability.

DESCRIPTIVE STATISTICS

1.Big Data Analytics in Hotels

Table 3: Descriptive statistics of Big Data Analytics in Hotels

Code	The Axis	M	SD	R
Drivers For Applying BDA in Hotels				
BDA111	My manager assigns me to periodically follow up on guests' opinions about the hotel on social media (Facebook, Twitter, Instagram... etc).	3.55	1.18	3
BDA112	I prepare the required reports with statistics, eg (guests' opinions about the hotel) so I need to apply big data analytics to easily prepare them.	3.56	1.18	2
BDA113	I need to validate the data I collect before analyzing it and presenting it to my boss.	3.97	1.01	1
Easiness Of Applying BDA in Hotels				
BDA121	I collect supplier data from various sources.	3.27	1.30	4
BDA122	I collect employee data from various sources.	3.32	1.30	3
BDA123	I collect data about hotel guests from various sources.	3.36	1.23	2
BDA124	I collect data on tourism companies from various sources.	3.46	1.22	1

Perceived Usefulness from Applying BDA in Hotels				
BDA131	BDA helps me meet the wants and needs of the guests.	4.05	0.83	3
BDA132	BDA helps me prepare the required reports supported by official statistics and predict what is coming.	4.11	0.85	2
BDA133	BDA helps me in communicating and quickly circulating reports with my colleagues in other departments in hotel.	4.16	0.87	1
Total		**3.76**	**0.67**	

M = Mean **SD** = Standard Deviation **R** = Rank

1.1The sub variable "Drivers for Applying BDA in Hotels": It is noted in Table 3 that, "**BDA113**" comes at a first rank (M= 3.97, *SD*= 1.01) this result was agreed with Sun *et al.,* (2018), where they emphasized that the necessity of good data and the level of confidence in different data sources. Then comes "**BDA112**" (M= 3.56, *SD*= 1.18), this outcome was in agreement with Al-Aklabi (2019), who ensured that all units in the organization make the best decisions based on the information supplied by BDA. On the other hand, "**BDA111**" is ranked last variable (M= 3.55, *SD*= 1.18).

1.2 The sub variable "Easiness of Applying BDA in Hotels": Based on the previous table, "**BDA124**" comes at a first rank (M= 3.46, *SD*= 1.22). Followed by "**BDA123**" (M= 3.36, *SD*= 1.23), this result agreed with Cole *et al.*, (2015), where

they emphasized that BDA allows companies to gather large amounts of information about customers. Morever, "**BDA121**" is ranked last variable.

1.3 The sub variable "Perceived Usefulness from Applying BDA in Hotels": Table 3 revealed that, "**BDA133**" comes at a first rank (M= 4.16, *SD*= 0.87). Then comes "**BDA132**" (M= 4.11, *SD*= 0.85), this outcome agreed with Al-Aklabi (2019); Hylving and Lindberg (2021), where they noted that implementing BDA in businesses has the potential to increase creativity and accuracy. However, "**BDA131**" is ranked last variable (M= 4.05=, *SD*= 0.83), this result agreed with Al-Qirim *et al.*, (2017), where they stressed that BDA adoption improves guest satisfaction more efficiently.

It's worth noting that the statistical analysis results in table 3 showed that the total mean of BDA in hotels was (3.76) with a standard deviation of (0.67), indicating a high degree of agreement for all BDA in hotels phrases which means that this variable has a high level at hotels.

1.2 The Hotel Performance Efficiency

Table 4: Descriptive statistics for the hotel performance efficiency variable

Code	The Axis	M	SD	R
Efficiency1	A manager takes responsibility for his actions and decisions and doesn't blame me.	3.53	1.17	5
Efficiency2	My manager is objective when allocating tasks without being influenced by personal consderation	3.42	1.23	6
Efficiency3	I respond to requests for support and assistance to my colleagues in other	4.02	0.83	2

	departments of the hotel.			
Efficiency4	I care about performing the work assigned to me without the guidance of my manager.	3.95	0.89	3
Efficiency5	I stick to working hours and make sure to be present when needed at the hotel.	4.17	0.88	1
Efficiency6	The hotel is constantly training me to keep pace with technological development.	3.58	1.36	4
Total		**3.79**	**0.69448**	

M = Mean **SD** = Standard Deviation **R** = Rank

From the previous table, "**Efficiency5**" is the most common procedures in hotels (M= 4.17, *SD*= 0.88). Followed by "**Efficiency3**" (M= 4.02, *SD*= 0.83). Morever, "**Efficiency4**" comes at a third rank (M= 3.95, *SD*= 0.89). On the other hand, "**Efficiency2**" came at the last rank.

The statistical analysis results in the above table indicated that the total mean of the hotel performance efficiency was (3.79) with a standard deviation of (0.69), which indicated a high degree of agreement for all the hotel performance efficiency phrases which means that this variable has a high level at hotels, these results agree with Poldrugovac *et al.*, (2016), where they stressed that efficiency is one of the key factors of management control and a prerequisite for making improvements in hotels performance.

1.3 Attitudes and Behaviors of employees Towards Big Data in Hotels

Table 5: Attitudes and behaviors of employees towards BD in hotels variable

Code	The Axis	M	SD	R
Attitude1	I have prior knowledge of big data analytics	3.18	1.35	4
Attitude2	I seek to participate in making decisions in the department in which I work in the hotel.	3.88	0.84	3
Attitude3	I am interested in reading all that is new in the hotel business, and I try to implement it in my hotel.	4.19	0.77	2
Attitude4	I am always keen to develop myself to keep pace with technological development.	4.36	0.72	1
Total		**3.9087**	**0.67794**	

M = Mean **SD** = Standard Deviation **R** = Rank

Table 5 shows that, "**Attitude4**" comes at a first rank (M= 4.36, *SD*= 0.72). Followed by "**Attitude3**" (M= 4.19, *SD*= 0.77). Morever, "**Attitude2**" comes at a third rank (M= 3.88, *SD*= 0.84). Furthermore, "**Attitude1**" is ranked last variable (M= 3.18, *SD*= 1.35) this result agree with Rodrigues *et al.*, (2020), where they emphasized that hotel employees report a low level of understanding about BDA capabilities. It's worth noting that the statistical analysis results in table 5 showed that the total mean of employee attitude and behavior toward BD in hotels was (3.90) with a standard deviation of (0.67), indicating a high degree of agreement for all employee attitudes and behaviors toward BD in hotels variable phrases, implying that this variable has a high level at hotels.

1.4 Challenges of Applying Big Data Analytics in Hotels

Table 6: Descriptive statistics for challenges of applying BDA in hotels

Code	The Axis	M	SD	R
Challenge1	I do not have previous experience in dealing with BDA	3.65	1.36	4
Challenge2	The hotel does not provide a strong infrastructure that allows the use of big data analytics.	3.53	1.36	5
Challenge3	One of the challenges of implementing BDA in the hotel is the continuous growth of the volume of big data.	4.05	0.93	3
Challenge4	One of the challenges of implementing BDA in the hotel is the difficulty of storing data.	4.09	0.93	2
Challenge5	Data security (electronic attacks) is one of the challenges of applying big data analytics in the hotel.	4.21	0.89	1
Total		**3.9108**	**0.84925**	

It is noted in Table 6 that, "**Challenge5**" comes at a first rank (M= 4.2, *SD*= 0.89), this result agreed with Karthikeyan and Benjamin (2019), where they emphasized that there are concerns around security of BDA. Followed by "**Challenges4**" (M= 4.09, *SD*= 0.93), This outcome coincided with Rodrigues *et al.,* (2020), who stated that storing huge volumes of data is a challenge for hotel employees. Furthermore, "**Challenge3**" comes at a third rank (M= 4.05, *SD*= 0.93), this finding was in line with Zhao *et al.*, (2019) and Abou El Dahab and Mahgoop (2020), who both stated that data growth is increasing day by day. Morever, "**Challenge1**" comes at a fourth rank (M= 3.65, *SD*= 1.36) this outcome agreed with Miller (2014), and Abou El Dahab and Mahgoop (2020), where they confirmed that there is a lack of Personnel specialized in

BDA. However, "**Challenge2**" is ranked last variable (M= 3.53, *SD*= 1.36). Table 6 shows that the total mean of the challenges of implementing BDA in hotels was (3.9108) with a standard deviation of (0.84925), indicating a good degree of agreement for all the challenges of applying BDA in hotels phrases, indicating that this variable has a high level at hotels.

TEST OF HYPOTHESES

To test ***H1***, ANOVA test was used as follows:

Table 7: Differences between the hotel departments in terms of applying BDA at a significance level of 0.05

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	36.520	8	5.217	14.357	.000
Within Groups	141.359	389	.363		
Total	**177.878**	**397**			

The data in Table (7) shows that the sig. level is.000 (less than.05), indicating that there are differences between hotel departments in terms of applying BDA. As a result, the first hypothesis ***H1*** is not accepted.

Table (8) indicted that these differences are in favor of **"Marketing and Sales"** department (M= 4.15, *SD*= 0. 38), followed by "**Front Office**" department (M= 4.06, *SD*= 0. 55), Furthermore, "**Accounting**" comes at a third rank (M= 4.0654, *SD*= 1.00). Morever, "**HR**" comes at a fourth rank (M= 3.93, *SD*= 0.55). Furthermore, "**Security**" comes at a 5th rank (M= 3.78, *SD*= 0.61). However, "**Food&Beverage**" comes at a 6th rank (M= 3.59, *SD*= 0.64). Moreover, "**Engeneering**" is ranked last variable (M= 3.11, *SD*= 0.79).

Table 8: Means of BDA according to the department

Department	Mean	N	Std. Deviation	Rank
Front Office	4.0672	63	.55599	2
Housekeeping	3.5418	69	.65170	7
Food&Beverage	3.5923	90	.64898	6
Security	3.7859	37	.61515	5
Engeneering	3.1131	34	.79609	8
Accounting	4.0654	40	.45510	3
Marketing and Sales	4.1559	38	.38544	1
Department	**Mean**	**N**	**Std. Deviation**	**Rank**
HR	3.9379	26	.55556	4
Total	3.7601	397	.67021	

To test H_2, Pearson and linear regresion tests were used as follow:

Table 9: Correlation between Drivers for applying BDA and the efficiency of hotel performance at a significance level of 0.05

Variables		Efficiency of hotel performance
Drivers for applying BDA	Pearson Correlation	.334**
	Sig. (2-tailed)	.000
	N	397

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

Table 10: Regression coefficients for the effect of drivers for applying BDA on the efficiency of hotel performance

Model	B	R^2	T	Sig.
(constant)	2.717	0.112	17.428	.000
Drivers for applying BDA	.285		7.050	.000

From tables (9) and (10) the, (R) value (0.334) referred that there is a low degree of correlation between drivers for applying BDA and the efficiency of hotel performance from the employees' point of view, as well as the coefficient of determination (R^2) is (0.112), suggesting that 11.2% of the variation of the efficiency of hotel performance was explained by the drivers for applying BDA variable. Moreover, it seems that the regression coefficient statistically significant, P.< 0.05, so the variable of applying BDA has a statistical effect on the efficiency of hotel performance. This result coincided that the second hypothesis of research is unacceptable. This is consistent with Hylving and Lindberg (2021), where they indicated that the applying BDA has a significant influence on the efficiency of hotel performance, and there is a positive correlation between the applying BDA and hotel performance. Furthermore, Aaldering and Daniels (2015), emphasized that BDA helps organizations to improve their performance. The following equation can be inferred to predict the efficiency of hotel performance from the level of applying BDA as follow:

Efficiency of hotel performance = 2.717 + (0.285* drivers for pplying BDA)

To test ***H3,*** Pearson and linear regresion tests were used as follows:

Table 11: Correlation between the easiness of applying BDA and Attitudes and behaviors of employees towards BD in hotels.

Variables		**Easiness of applying BDA**
Attitude	Pearson Correlation	.467**
	Sig. (2-tailed)	.000
	N	397

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

Table 12: Regression coefficients for the effect of attitudes and behaviors of employees towards BD on the easiness of applying BDA

Model	**B**	**R^2**	**T**	**Sig.**
(constant)	1.032	0.218	17.428	.000
Attitudes and behaviors of employees towards BD	.625		10.492	.000

From tables (11) and (12) the, (R) value (0.467) referred that there is a low degree of correlation between attitudes and behaviors of employees towards BD and the easiness of

applying BDA from the employees' point of view, as well as the coefficient of determination (R^2) is (0.218), suggesting that 21.8% of the variation of the easiness of applying BDA was explained by the Attitudes and behaviors of employees towards BD variable. Moreover, it seems that the regression coefficient statistically significant, P. < 0.05, so the variable of (Attitudes and behaviors) has a statistical effect on the easiness of applying BDA. This result coincided that ***H₃*** unacceptable. This is inconsistent with Pugna *et al.*, (2019), where they indicated all managers have a great interest in BD and BDA and their impact on businesses. The following equation can be inferred to predict the easiness of applying BDA from the level of Attitudes and behaviors of employees towards BD as follow:

Easiness of applying BDA = 1.032+ (0.625 * Attitudes and behaviors)

To test ***H₄***, Pearson and linear regresion tests were used as follows:

Table 13: Correlation between the challenges of implementing BDA and the efficiency of hotel performance at a significance level of 0.05

Variables		**Efficiency of hotel performance**
The challenges of implementing BDA	Pearson Correlation	-.277**
	Sig. (2-tailed)	.000
	N	397

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

Table 14: Regression coefficients for the effect of challenges of implementing BDA on the efficiency of hotel performance

Model	B	R^2	T	Sig.
(constant)	4.677	0.007	29.562	.000
challenges of implementing BDA	-.226-		-5.725-	.000

From tables (13) and (14) the, (R) value (-.277) referred that there is a low degree of correlation between challenges of implementing BDA and the Efficiency of hotel performance from the employees' point of view, as well as the coefficient of determination (R^2) is (0.007), suggesting that 0.07% of the variation of the efficiency of hotel performance was explained by the challenges of implementing BDA variable. Moreover, it seems that the regression coefficient statistically significant, P. < 0.05, so the variable of (challenges of implementing BDA) has statistical effect on the efficiency of hotel performance. This result coincided that H_4 was unacceptable. This is consistent with Al-Aklabi (2018); Abou El Dahab and Mahgoop (2020), where they indicated that there are many challenges and difficulties that organizations face as they work with BDA, which effect on hotel performance efficiency. The following equation can be inferred to predict the efficiency of hotel performance from the level of challenges of implementing BDA as follow:

Efficiency of hotel performance = 4.677- (0.226* challenges of implementing BDA)

CONCLUSION

Researchers discovered that hotels must validate data before analyzing it (Sun *et al.,* 2018); furthermore, using BDA has the potential to improve innovation, accuracy in hotels (Al-Aklabi, 2019); moreover, using BDA helps to increase the effectiveness and efficiency of hotel employees and hotel performance (Aaldering and Daniels, 2015), and employees are always striving to develop themselves to keep pace with technological development. On the other hand, the challenges faced by hotels are the high cost of using BDA applications (Al-Qirim *et al.,* 2017), furthermore, the difficulty of data security (Karthikeyan and Benjamin, 2019); the growth of data is increasing day-by-day (Zhao *et al.,* 2019) and the difficulty of storing data (Rodrigues *et al.,* 2020).

LIMITATION AND FUTURE RESEARCH

Although this research has a number of limitations, it does open up possibilities for further research. First, only staff of independent hotels and hotel chains were included in this research. Second, this research was restricted to hotel employees for hotel chains and five-star hotels in the governorates of Luxor, Aswan, the Red Sea, and Sharm El-Sheikh. Finally, future studies should focus on the impact of BDA on hotel revenue, marketing, and guest satisfaction, as well as the extent to which BDA is used in four-star and economical hotels, as well as the identification of barriers to its use in other governorates.

IMPLICATIONS AND RECOMMENDATIONS

Based on the findings, top management should provide appropriate training for hotel employees on BDA and how to apply it, which is considered beneficial in achieving hotel goals. Furthermore, Managers must treat their employees equally, and distribute work fairly. On the other hand, in cooperation with the Ministry of Tourism and Egyptian Hotel Association, academic institutions should introduce, support and develop BD and BDA educational programs and units for hotel employees. Finally, senior management should provide support to employees, which is generally considered useful in helping them accomplish assignments.

REFERENCES LIST

- Aaldering, P. H., & Daniels, H. A. M. (2015). Utilizing Data and Data Analytics to Improve Supply Chain Performance.
- Ali, M. R. M. (2020). Big Data Analytics: The businesses future. IOSR Journal of Business and Management. PP 20-25
- Al-Qirim, N., Tarhini, A., & Rouibah, K. (2017, August). Determinants of big data adoption and success. In Proceedings of the International Conference on Algorithms, Computing and Systems (pp. 88-92).
- Basheer, Saad Zaghloul. (2003) Your guide to the statistical program spss Iraq pp.155-167.

- Björkman, F., & Franco, S. (2017). How big data analytics affect decision-making: A study of the newspaper industry.
- Blazquez, D., & Domenech, J. (2018). Big Data sources and methods for social and economic analyses. Technological Forecasting and Social Change, 130, 99-113. P104.
- Cole, D., Nelson, J., & McDaniel, B. (2015). Benefits and risks of big data. Association for Information Systems AIS Electronic Library (AISeL) SAIS.
- Ćorluka, G., Mikinac, K., & Peronja, I. (2017). How to approach hotel performance measurement? a conceptualization of key determinants. In 4th International Scientific Conference ToSEE-Tourism in Southern and Eastern Europe " Tourism and Creative Industries: Trends and Challenges" Opatija, Croatia, 4-6 May 2017 (pp. 71-82).
- Gurcan, F. (2019). Extraction of core competencies for big data: implications for competency-based engineering education. Int. J. Eng. Educ., 35(4), 1110-1115.
- Hair, J. F., Black, W. C., Babin, B. J., Anderson, R. E., & Tatham, R. L. (2010). Multivariate data analysis New Jersy: Pearson Education.
- Hylving, L., & Lindberg, S. (2021, January). Practical Wisdom and Big Data Dilemmas: The Case of the Swedish Transport Administration. In Proceedings of the 54th

Hawaii International Conference on System Sciences (p. 5120).

- Joshi, B. M., & Patel, S. V. (2019). Comparative study of analytic tools of BigData.

- Kulkarni, A. J., Siarry, P., Singh, P. K., Abraham, A., Zhang, M., Zomaya, A., & Baki, F. (Eds.). (2020). Big Data Analytics in Healthcare. Springer. P4.

- Luo, H., Yang, Y., & Law, R. (2014). How to achieve a high efficiency level of the hotel industry?. International Journal of Contemporary Hospitality Management.

- Manohar, P. (2020). Impact of Adopting Big Data Analytics on Strategic Decisions: A Delphi Study Using the Technology–Organization–Environment (TOE) Framework (Doctoral dissertation, Capella University).

- Miller, S. (2014). Collaborative approaches needed to close the big data skills gap. Journal of Organization design, 3(1), 26-30.

- Osman, A. M. S. (2019). A novel big data analytics framework for smart cities. Future Generation Computer Systems, 91, 620-633.

- Papadopoulos, T., Gunasekaran, A., Dubey, R., & Fosso Wamba, S. (2017). Big data and analytics in operations and supply chain management: managerial aspects and practical challenges. Production Planning & Control, 28(11-12), 873-876.

- Patgiri, R., & Ahmed, A. (2016). Big data: The v's of the game changer paradigm. IEEE 18th International Conference on High Performance Computing and Communications; (pp. 17-24).
- Poldrugovac, K., Tekavcic, M., & Jankovic, S. (2016). Efficiency in the hotel industry: an empirical examination of the most influential factors. Economic research-Ekonomska istraživanja, 29(1), 583-597
- Prabhu, C. S. R., Chivukula, A. S., Mogadala, A., Ghosh, R., & Livingston, L. J. (2019). Big Data Analytics. In Big Data Analytics: Systems, Algorithms, Applications. Springer, Singapore.
- Pugna, I. B., Duţ escu, A., & Stănilă, O. G. (2019). Corporate attitudes towards big data and its impact on performance management: A qualitative study. Sustainability, 11(3), 684.
- Rodrigues, J. P., Sousa, M. J., & Brochado, A. (2020). A Systematic Literature Review on Hospitality Analytics. International Journal of Business Intelligence Research (IJBIR), 11(2), 20-28.
- Sainaghi, R., & Baggio, R. (2021). Destination events, stability, and turning points of development. Journal of Travel Research, 60(1), 172-183.
- Song, I. Y., & Zhu, Y. (2016). Big data and data science: what should we teach?. Expert Systems, 33(4), 364-373.

- Sun, S., Cegielski, C. G., Jia, L., & Hall, D. J. (2018). Understanding the factors affecting the organizational adoption of big data. Journal of Computer Information Systems, 58(3), 193-203.
- Thirathon, U., Wieder, B., Matolcsy, Z., & Ossimitz, M. L. (2017). Big Data, Analytic Culture and Analytic-Based Decision Making Evidence from Australia. Procedia computer science, 121, 775-783.
- Thompson, S. K. (2012). Sampling. Third Edition. John Wiley & Sons. (Simon Fraser University). P 60.
- Ugwu, K. E., Okoroji, L. I., & Chukwu, E. O. (2018). Participative decision making and employee performance in the hospitality industry: A study of selected Hotels in Owerri Metropolis, Imo State. Management Studies and Economic Systems (MSES), 4(1), 57-70.
- Ur Rehman, M. H., Yaqoob, I., Salah, K., Imran, M., Jayaraman, P. P., & Perera, C. (2019). The role of big data analytics in industrial Internet of Things. Future Generation Computer Systems, 99, 247-259.
- Yallop, A., & Seraphin, H. (2020). Big data and analytics in tourism and hospitality: opportunities and risks. Journal of Tourism Futures.
- Yang, Z., Xia, L., & Cheng, Z. (2017). Performance of Chinese hotel segment markets: Efficiencies measure

based on both endogenous and exogenous factors. Journal of Hospitality and Tourism Management, 32, 12-23.

- Zhao, Y., Yu, Y., Li, Y., Han, G., & Du, X. (2019). Machine learning based privacy-preserving fair data trading in big data market. Information Sciences, 478, 449-460.

- Zheng, Y., Wang, W., Liu, W., & Mingers, J. (2019). A performance management framework for the public sector: The balanced stakeholder model. Journal of the Operational Research Society, 70(4), 568-580.

- الأكلبي، على بن ذيب (2018)، أهمية تحليل البيانات الضخمة في اتخاذ القرار في جامعة الملك سعود، المؤتمر السنوي الرابع والعشرون لجمعية المكتبات المتخصصة - فرع الخليج العربي 6-8 مارس 2018 ،مسقط، سلطنة عمان، ص 1-16.

- أبوالدهب، محمود محمد أحمد و محجوب، محمد محمود مصباح (2020)، تصميم بيئة تدريب إلكترونية تشاركية قائمة على نمطي الإستقصاء الحر/الموجه وأثرها في تنمية بعض كفايات إدارة البيانات الضخمة Data Big لدى اختصاصيي المعلومات، المجلد الثانى، العدد الثانى، المجلة العلمية للمكتبات والوثائق والمعلومات ، قسم المكتبات والوثائق وتقنية المعلومات،كلية الآداب، جامعة القاهرة.

- أميرهم، جيهان عادل (2020)، أثر تحليل البيانات الضخمة (Data Big)على الأداء المالي والتشغيلي في منظمات الأعمال)دراسة تطبيقية(، مجلد 21، العدد الثانى، مجلة البحوث المالية والتجارية، كلية التجارة، جامعة بور سعيد.

- شكيب، باشماني. (2014). دراسة تحليلية مقارنة للصيغ المستخدمة في حساب حجم العينة العشوائية. مجلة جامعة تشرين للبحوث

والدراسات العلمية - سلسلة العلوم الاقتصادية والقانونية المجلد(63) العدد (5)، ص.ص 85-100.

- شمطو، سمير خليل (2016)، الإدارة الفندقية بين النظرية والتطبيق، مركز كربلاء للدراسات والبحوث، ط 1 ، العراق.
- كساب، عماد (2021)، مؤشرات قياس الأداء الوظيفي والمؤسسي بين النظرية والتطبيق (نماذج عملية). المجلة العربية للآداب والدراسات الإنسانية، 5(16)، 191-224.