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mixed methods, DEA, BARS, hotel performance, benchmarking, Egypt

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Introduction

Despite the fact that the hotel industry is facing many challenges to meet customer's expectations, it is striving hard to keep with the new leadership styles, recent technology innovations. Therefore, studying their performance is considered one of the most critical success factors (Goncharuk & Lazareva, 2017; Sampaio, Hernández-Mogollón, & Rodrigues, 2018). Nowadays, hotels are experiencing outstanding transformation in terms of hybrid different measures of performance and which measure is enough to highlight their current market position. That's why hotel managers are now placing many concerns about measuring, comparing and benchmarking their performance with market competitors (Pan, Kuo, & Bretholt, 2010; Sainaghi, Phillips, Baggio, & Mauri, 2019).

Performance measuring techniques have been documented by many academics as a crucial function in sustaining competitive advantage for organizations (Abdullah, 2018; Matovic, 2002). However, the best technique still needs consensus from both academics and practitioners. There is no doubt that studying and measuring performance in hotels is considered one of the critical studies. Yet, little attention, if any, has been addressed for this issue. Considering while talking about performance, hotel managers do not like giving any information regarding their financial data. Therefore, researchers might be reluctant to study this issue due to the difficulty of obtaining hotels' performance data (Menicucci, 2018).

Most performance measuring techniques rely on numeric and financial ratios between system inputs/outputs and derived from the technical efficiency metrics (Bagnera, 2016). The higher performance generates higher profits according to the resource-based theory. However, performance is a complex term and there are many problems related to its definition and measurement. The performance concept flourishes in manufacturing where it is easier to measure inputs or outputs than in the service (Yadav & Singh, 2018). Hotel performance is mostly intangible; therefore, it is difficult to measure outputs, because of many hotel departments, the output for each department is different than others (Enoma & Allen, 2007; Zaki, 2014). The most popular example to show how and why hotels measure their performance is easily noticeable in their Food and Beverage (FB) departments (Goncharuk & Lazareva, 2017; Njuangang, Liyanage, & Akintoye, 2015).

Accordingly, this study approaches the FB section performance in a well-known five-star hotel chain in Egypt. It has four branches in Cairo, Alexandria, and Sharm El-Sheikh. Using the Data Envelopment Analysis (DEA) technique with panel data from 2007 to 2016 was subjected to performance analysis and calculation. For doing these calculations, the total profit and revenue were identified as system outputs and three types of inputs (the prime cost, the number of FB employees, and the total number of meals) were also subjected for measuring the performance. The relationship between outputs and inputs using the linear programming technique of DEA (Cooper, Seiford, & Zhu, 2004; Mhlanga, 2018) was implemented to measure FB performance within each hotel, which in turn, will get a performance ratio to help for comparison and benchmark purposes. Accordingly, this study intended to measure and further benchmarking the performance ratios among FB departments in an Egyptian hotel chain.

Review of Related Literature

Performance Dilemma in the Egyptian Hotel Industry

The issue of performance in the hotel industry is '*a hot potato*' especially in one of the developing countries like Egypt. The speedy growth of Egypt as a rising economic system with noteworthy foreign funding provides an opportunity for empirical research to gain understandings into the impacts of political crisis regarding the extent of performance fluctuations amongst the hotel market (Aly, El-Halaby, & Hussainey, 2018). It is witnessed a constant change in the hotel industry in Egypt which is appearing in redesigning and redefining the hotel sector, especially after the 25th January revolution. There are many challenges faced by the Egyptian hotel industry. One such challenge is related to the method of getting a constant Key Performance Indicators (KPIs) (Voordt & Jensen, 2018) since there is a contradiction concerning the best KPIs adds value to the hotel executives in cases of market decline.

According to Colliers (2018), the direct contribution of travel and tourism to GDP in 2017 was EGP190.3bn (5.6% of GDP). This is forecast to rise by 3.2% to EGP196.5bn by the end of 2019. This primarily reflects the economic activity generated by industries such as hotels, restaurants, travel agents, leisure industries, airlines and other passenger transportation services (excluding commuter services). Accordingly, it is an interesting point to develop a framework contributes to a better understanding of the hotel performance measurement issue in the Egyptian hotel sector. However, it is not an easy task to investigate this significant sector at all so that an in-depth case study involving four hotels was selected as the context of this research.

Consistent with prior literature, the dilemma of performance issue in hotels is related to the ambiguity of the performance measurement in one hand, and the presence of many different KPIs on the other hand (Anyaeche & Oluleye, 2009; Holcomb, Hoffart, & Fox, 2002; Khalaf & Salem, 2018; Mishra, Gunasekaran, Papadopoulos, & Dubey, 2018).

Prior studies lack an agreed and constant definition of the performance measuring issue. Regarding the historical roots of performance, the concept was started and flourished in manufacturing, then in services (Goncharuk & Lazareva, 2017; Liu, Tsai, & Wu, 2018; Sahay, 2005). Many definitions of performance were found in the literature and in dictionaries. Merriam-Webster dictionary defined performance as '*the execution of an action*', which in turn was defined as '*yielding or furnishing results, benefits, or profits*', and '*yielding or devoted to the satisfaction of wants or the creation of utilities*' (Mish, 1985, p. 210). Performance is defined by Anitsal and Schumann (2007) according to the manufacturer's approach as a relationship between generated outcomes (services or products) in a specific system from inputs (capital, labor, materials, and data). Performance might be defined as a simple economically concept as a ratio of outputs to specific inputs and how well the inputs meet the needs of outputs (Kumar & Suresh, 2009; Rhoads, Ferguson, & Langford, 2006).

Performance is defined as a multidimensional concept which reflects opposing views and related problems. From one hand, as discussed by Sigala, Jones, Lockwood and Airey (2005) and Linna Pekkola, Ukko and Melkas (2010) that performance has been approached as an umbrella concept containing quality, efficiency, effectiveness, and other performance dimensions. On the other hand, Djellal and Gallouj (2008) defined performance as a component in a productivity system when it combines with profitability, the result would be efficiency. Because of this confusion and the mismatching over a specific definition of performance, many difficulties in measurement have been raised. Moreover, the variety of performance measurement techniques creates another ambiguity in further benchmarking purposes (Chand & Ranga, 2018).

It could be concluded from the cited empirical studies, performance measurement is still defined according to everybody sights (Gupta & Dey, 2010; Ponte, Pesci, & Camussone, 2017). Considering performance prior studies in relation to hotel's operation, many academics expressed it in an economic equation (Jones & Siag, 2009; Kilic & Okumus, 2005; Sigala et al., 2005) as a relationship between outputs and inputs. The main difference of the meaning of performance between manufacturing and service approach is that as a system, manufacturers focus on reducing resources or inputs to ensure production efficiency (Masa'deh, Alananzeh, Tarhini, & Algudah, 2018). However, service providers look at the main aim of their system or the outputs to ensure the quality of doing things (Effectiveness) approach (De Pelsmacker, van Tilburg, & Holthof, 2018).

Performance Gauging Techniques: Quantitative Versus Qualitative Measures

Measuring performance in the hotel industry is quite tricky for many reasons. Wadongo, Odhuno, Kambona and Othuon (2010) related it to the lack of collected financial outputs (e.g. sales revenue, profit, costs, and other expenses). Similarly, Linna et al. (2010) added that the hotel executives have a narrow approach for defining and measuring performance. Wadongo et al. (2010) confirmed this complexity to the relativity which leads to incorrect values, as everyone is viewed and measure performance, according to his own experience. Moreover, Gupta and Dey (2010) concluded two reasons related to this problem: first, it is hard to define both a suitable input or output and getting a relationship between them; second, the more connection between productivity and performance analysis, many hotel employees when realizing attempts to such performance evaluations and measuring, they fear to leave their jobs in case of reporting low performance (Marco-Lajara, Zaragoza-Sáez, Claver-Cortés, & Úbeda-García, 2018; Safavi & Karatepe, 2018).

Finding the most suitable techniques for measuring and improving performance in hotels is a complicated process (Peng Xu, Chan, & Qian, 2012; Sampaio et al., 2018). This is especially true in hotel operations, where an accurate and clear identification of the output in quantitative terms is more difficult than in the manufacture firms (Assaf & Tsionas, 2018). The main purpose of measuring performance is to evaluate the current situation of an organization and then to compare its result with market competitors (Abdullah, 2018). There are quantitative and qualitative approaches used for these calculations. The quantitative approach measures performance in a traditional physical way. It measures the called multifactorial methods as it aggregates the total number of outputs divided by the total number of inputs (Zhou, 2013). Even though, the qualitative approaches are considered subjective in use; it is based on human's subjective assessments. It is preferred if the output related to quality or satisfaction. Consequently, the outputs here are index-based or indicators (such as value added, quality, and satisfaction). These indices or indicators act as a proxy for the numeric values of the output (Mishra et al., 2018; Zaki, Jones, Morsy, & Abdelmabood, 2013).

Regarding the quantitative measurement of performance, the old parametric analysis techniques (e.g. regression) are used to get performance ratios. However, it does not give a widespread measurement of the actual performance. Presently, there is a need to measure performance using sophisticated methods of frontier analysis (Assaf, Josiassen, & Oh, 2016). This is because of the multiple inputs and outputs of hotel services are hard to calculate. The sophisticated or frontier measurement methods fill the gap of the traditional old methods, as it is not qualitative- based approaches. Frontier means 'best practice production' as these techniques compare all the inputs and outputs into a single measure of performance ratio (Bai & Sarkis, 2014). Frontier techniques were deeply rooted and implemented at manufacturing during 1950. It aims to model the production process to explain the relative best practice of different Decision-Making Units (DMUs). Therefore, multiple DMUs (e.g. Hotels) compose the production frontier. It is noted that Anderson, Fok and Scott (2000) are the pioneers to adopt DEA technique in the American hotel industry and then recently many academics from other countries follow their approach (Chen, 2015; Hu, Chiu, Shieh, & Huang, 2010; Maestrini et al., 2018).

DEA as a frontier technique is considered a non-parametric technique (data that are not subject to normal distribution, it is suitable for ranking from lowest to highest). It is based on distance functions (it represents efficiency, for example as a particular line that any point on the line is efficient and any point away is inefficient (Assaf & Agbola, 2014; Yin Tsai, & Wu, 2015).

Whenever it comes closer to the efficiency line or the distance of the line, it indicates the relative improvement in efficiency and vice versa. DEA is used as a technical efficiency measure and needs multiple outputs/inputs of each DMU. It aims to identify the best practice DMU. The most performed DMU is rated as '1' efficiency score and the unperformed units are rated by '0' efficiency score. Consequently, it is popularly used to conduct performance comparisons at an aggregated level. DEA advantages other methods by providing an absolute efficiency evaluation and producing a single score from multiple inputs and outputs of comparable units using a benchmark of 100% efficiency (Huang, 2017).

In relation to the hotel context, performance measurement using DEA is seen as a vital concern and most popular technique. DEA is usually used for benchmarking and to present the best practices. It needs longitudinal and historical data clarifying variances and fluctuations (Assaf, & Tsionas, 2018). On the other side, the qualitative performance measurement methods in hotels (Pnevmatikoudi & Stavrinoudis, 2016) vary according to the management's objectives and vision. These techniques are used by every hotel manager or supervisor according to their preferences and the cost factor of achieving the desired goals (Sainaghi, Phillips, & Zavarrone, 2017; Sainaghi, Baggio, Phillips, & Mauri, 2018). These methods could be effectively used by hotels as seen in Table 1.

Table 1. Qualitative Measures of Performance

Qualitative measures	Sources	Description
Job Rating Checklists	(Borman, White, Pulakos, & Oppler, 1991; Jerome, 2004; Bernini & Guizzardi, 2015)	It is a simple technique as each evaluator is provided with pre-arranged questions related to job aspects. With a 'yes' or 'no' answer.
Forced Choice	(Hatry, 2006; Zigan & Zeglat, 2010; Pnevmatikoudi & Stavrinoudis, 2016)	It is either paired statements in which the supervisor put two options and be required to select the best one. Alternatively, forced ranking in which a number of potentials are provided in between.
Behaviourally Anchored Rating Scale (BARS)	(Pounder, 2000; Pnevmatikoudi & Stavrinoudis, 2016)	İt is intended to ensure the qualities and skills needed for a specific job. It ranks behavioral models from 'very poor' to 'excellent'.
Multi-Rater Assessment (360- Degree)	(Peters,2000; Oh & Berry, 2009; Gumustekin, Ozler, & Yilmaz, 2010; Lahap et al., 2015)	That is a relatively new system that needs appraisals from an individual's supervisors or from others outside the company to provide the greatest feedback.
The Balanced Scorecard (BSC)	(Kaplan & Norton, 1996; Zigan & Zeglat, 2010; Kang, Chiang, Huangthanapan, & Downing, 2015)	BSC provides a technique for organizations to balance the strategic priorities around finances, customers, processes, and people. BSC ensures that performance metrics at both an organizational and individual level are unbiased rather than twisted towards financial targets alone. After priorities identification for the business by BSC, employees are then expected to flow these into an individual 'personal' scorecard.
Performance Measurement Audit	(Houldsworth & Jirasinghe, 2006; Sainaghi et al., 2017)	It is a quick self-analysis composes of numerous statements with a rating scale (high- medium - low).
Output index method	(Jääskeläinen, 2009; Yin et al., 2015)	It is a preferred method in service as it makes an indicator for the non-quantifiable measures such as satisfaction or quality.

However, the qualitative performance measures have been proved imperative in hotel daily operations and practice (Sainaghi et al., 2018). The opposing methods of the quantitative approaches to measure hotel performance are still reliable and extensively used (Assaf & Tsionas, 2018). The old wisdom says *numbers do not lie*. Therefore, many hoteliers depend on performance metrics for benchmarking their financial results with the optimum.

Introducing a Hotel Performance Measurement Dynamic Model

The main idea of the proposed hotel performance dynamic model, (Figure 1) is that any hotel manager or a supervisor should distinguish between the existing performances measures used in the hotel daily operations. As discussed earlier the hotel managers could practice both the quantitative and qualitative measures. The next step is to calculate the performance from the suitable financial reports and finally, the benchmarking practice will help to survive and to keep up with the best competitors.

This model is based on three successive phases modified from Zaki et al., (2013); started from first, identifying the existing performance measures; followed by, measuring the performance using Data Envelopment Analysis (DEA) and LINGO application; third, benchmarking the performance index.

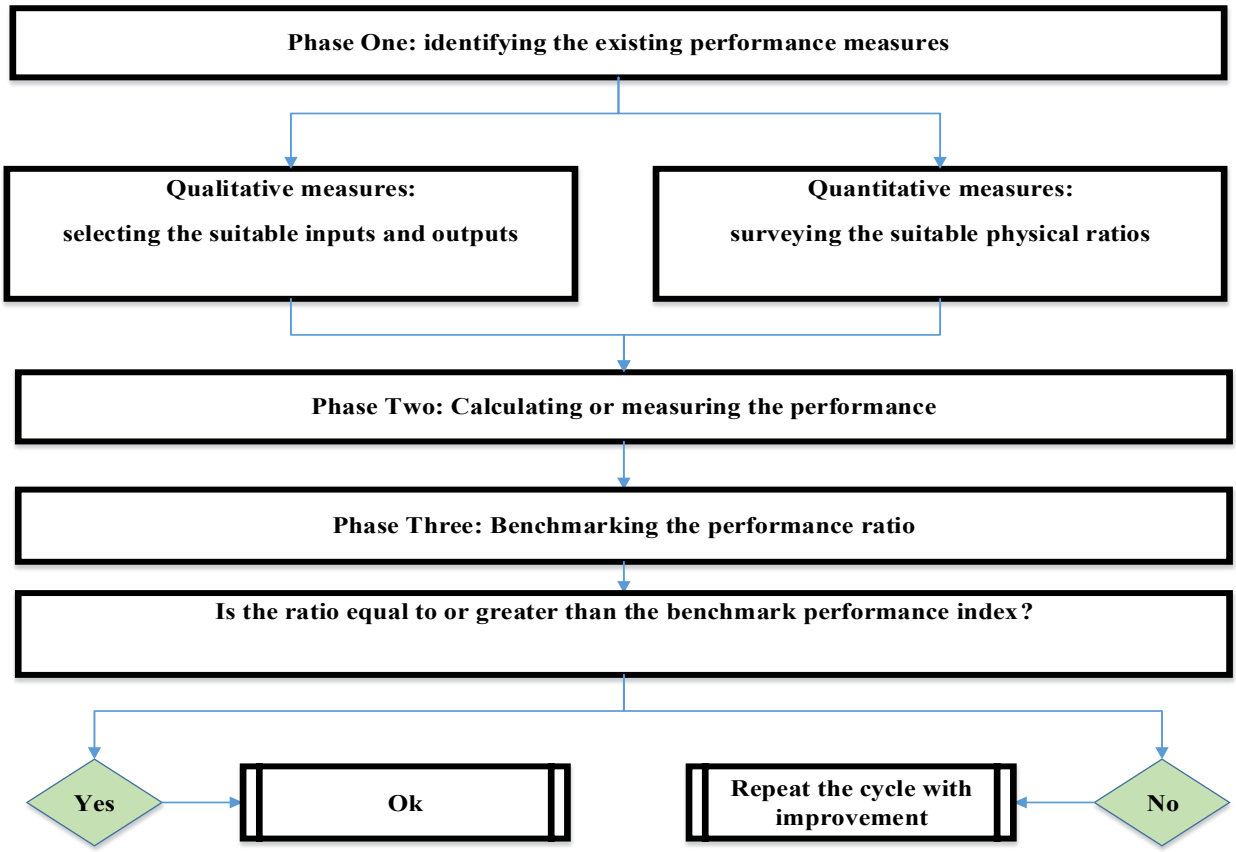

Figure 1. The proposed dynamic model for hotel performance measurement

The suggested dynamic model is considering another step and an extended contribution to Zaki et al. (2013) conceptual model. First, the research setting here is a well-known hotel chain case study. Second, this model is combining both the qualitative and quantitative performance measures in one of the largest hotel section which is the FB. Third, using one of the best programming languages to get the frontier analysis of DEA with the help of the recent technology applications as recommended by (Assaf & Tsionas, 2018, Zaki, 2017) extends to the previous related literature. Fourth, it could be argued that the final performance index should be reviewed and improved as part of the hotel continuous improvement program to confirm progress in the case of performance decline.

Research Design

The case study was selected as the main research tool for getting and collecting the primary data since the main aim of this fieldwork study is to explore and identify the existing performance measurement in multiple hotel cases (N = 4 hotels). Case study approach regarded as particularly appropriate in situations where contextual studies are being investigated. For instance, Yin (2014) stressed the importance of using case studies for understanding the accounting practices in their own business context. Yin (2014) further emphasized the need for having no control over the events of cases.

The decision was to select multiple methods of data collection to increase the validity of this research and effectively triangulate opinions from different actors in the investigated hotels. Data collection methods involve 20 in-depth interviews with hotel daily operation managers, group discussions with hotel staff, documentation collection (archival analysis of the hotel financial reports) and face to face observation. In order to obtain detailed information concerning the performance measurement methods, the interviews were carried out throughout the hotel hierarchy. To provide validated evidence for understanding the decision-making instrument and the performance measures used, documents including financial data sets for ten years and food and beverage daily reports were gathered from relevant departments (the main kitchen and the hotel restaurants). Considering the views of hotel line staff, it was decided to conduct group discussions with 150 hotel employees within the hotel chain all staff until saturation was achieved (Yin, 2014). The group discussions with hotel staff helped first, to get a detailed answer as participants were asked directly only one question requesting the existing performance measure used in their sections; second, to increase the validity of the second phase of the proposed dynamic model.

The interview schedule was also agreed based on a previous stamped consent form that was sent to every hotel manager including the main aim of this research and ensures the anonymity and privacy of results. A total of three months (from June 2018 till August 2018) were spent in this qualitative multiple-case interview study on a planned basis in order to perform the interviews, group discussions and observations properly. The interview process comprised interviews, data transcription and subsequent validation by respondents. During each visit, the operations, information flow, and internal functioning of the departments were reviewed and relevant documentation collected and filed accordingly. Data were analyzed using QRS NVIVO 11 starter software where the transcribed interviews were coded and placed into nodes for developing main themes.

To diagnose the currently existing used techniques for measuring performance within the hotel case study. It was used the simulation with the previously cited literature during the carried out interviews with hotel managers, food and beverage managers and non-managers staff as a qualitative approach to compare between performance techniques as written in previous literature to the existing methods which have been practiced and used within hotels investigated (Table 2). Some statistical charts using Excel sheets were used to highlight these existing methods in forms of frequencies, histograms, and tables.

As with the case of measuring the performance in the hotel's food and beverage departments, there are three steps placed into consideration. First step, collecting the data from the involved hotels in the case study using their confidential documents and using the archival analysis; second step, entering the data to DEA technique using the LINGO software version 18 to get

efficiency ratios while, the third step aimed to get an interpretation of the results to help in comparisons and benchmarks. These statistical programming stages aim to get an average score or a ratio from all the performance measures. The selected outputs were identified in LINGO based on the total food and beverage revenues from 2007 to 2016. The selected inputs are based on the total number of food and beverage, the total number of full-time employees, the prime food and beverage costs, and the total number of food and beverages covers. Finally, on-site observations improved the understanding and testing the proposed dynamic model. Simultaneous field notes were used to triangulate observations with the interviews data and guarantee further validation.

Research Results and Discussion

Interviews Results: The Existing Performance Measuring Techniques

In order to analyze the data collected through interviews, which were carried out face-to-face with 20 hotel department managers of hotels who have experience in the field. Different hotel sections (e.g. room division, restaurant, kitchen, housekeeping, front office) were selected at first in order to provide a reliable ground of the study dynamic model and to reflect the all used performance measures available inside the multiple-case study. The interview questions were sent to the respondents via email before the actual interviews to give the respondent enough time to prepare for the interview and to provide an accurate answer. It was highlighted the aim of research to the respondents and then they were asked to report their used performance measurement methods as shown in (Table 2). The researcher used his previous experience and simulation to compare respondents' answers with that written in the previously cited literature.

Table 2. Comparison Between Subjective Performance Measures in Theory and Practice

Theoretical qualitative measures	Similar measures used by investigated hoteliers
• Job Rating Checklists	• F.O Standard • Executives Report • Sequence of Service (S S)
• Forced Choice	• Standard tests • Applying core standards
• Behaviourally Anchored Rating Scale (BARS)	• Glitch report • Observation checklist • Duty checklist
• Multi-Rater Assessment (360- Degree)	• Richey report • Guest satisfaction index • Guest complaints • Employee satisfaction survey
• The Balanced Scorecard (BSC)	• Not used
• Performance Measurement Audit	• Performance appraisal (every 6 months) • Monthly performance audit • On the job follow-up
• Output index method	• Guest/ Employee satisfaction • Reviewing guest problems/complaints • Employee loyalty • Daily (espresso) report • Service Excellence

More specifically, the previously performance methods, the following section will demonstrate them one by one as following:

Job Rating Checklists

One of the main duties of a hotel manager is to make an enterprise work more efficiently and effectively. It is not possible to increase efficiency and performance in the hotel industry in the same way as in other industries. Table 3 highlighted the first qualitative performance measure according to the job rating checklist. The case study involved 20 hotel managers and 150 other staff participants as shown in the following tables' frequencies.

Table 3. Job Rating Checklists in Hotel Case Study

Measurement method	**Frequency**	
	n=20 Managers	n=150 Employees
F.O Standard		
Core standards applying	4	50
Reviewing Standards	6	90
Executives Report		
Supervisor daily report	5	100
Supervisor checklist	20	150
Daily executive's report	9	0
Managers checklist	3	0
Duty report	20	6
Sequence of Service		
Monitoring daily S S	3	0
Applying check in/out S S	20	0
How TO'S report	1	3
Standard tests	0	6
Applying core standards	0	10

The major influencing factor that may make a difference to employee's performance is the job itself. One of the hotel managers said '*The worker cannot focus entirely on the tasks which may result in poor performance. Job analysis is a systematic procedure for gaining objective information on work, opinions about work, conditions, and tasks which are or will be carried out. It is a cornerstone for other personal activities. It gives a picture of particular work and therefore creates an image of a person who should take that position*'. Most of the hotel managers reported that an employee's performance is a powerful thing for the hotel. For example, it was reported that '*It can tear the hotel down or boost its competitive advantage so high that no competitor can compete with that*'. However, some hotels do not see the reason to put so much emphasis on performance appraisal. They should because performance evaluations help the hotel improve the current performance, increase the employees' motivation, recognize the training needs, give feedback to the employees, solve job mistakes, let employees know what is expected from them, and several other reasons why the organization can benefit from having control over the employee's performance.

Forced Choice

Before starting to measure the performance, it should be acknowledged that the evaluation must be based on the same internal standards and that there has to be agreed on criteria for the evaluators and the staff. Having common evaluative standards helps the evaluator compare the results with equivalent scales. As with the case of involved hotels, it is noted that all hotel managers (20 managers) use the observation checklists as a forced choice method, to evaluate the performance, followed by using the glitch report (3 managers).

Behaviourally Anchored Rating Scale

Mostly all the 20 hotel managers reported using the duty checklist and observation checklist for measuring staff performance. Only one hotel manager said '*I always measure the performance of my team using the glitch report with my daily observation*'.

Multi-Rater Assessment (360- Degree)

Concerning the customer's point of view is 'mystery' shopping. Mystery shoppers are hired to observe and record their experience with the organization. They visit the organization randomly and play to be normal customers while evaluating the service and employee's performance. After the 'mystery' shopping has been done, the hired evaluators report back to the company about their findings. Field results showed that 80 percent of hotel staff uses the employee satisfaction survey and nearly most of the hotel managers use the guest satisfaction index (5%) and guest complaints (2%) respectively as indicators to the 360-degree method.

Performance Measurement Audit

However, this method is very important, only 8 managers used its similar techniques such as using the monthly performance audits (5 managers) and the performance appraisal every six months (2 managers) and (1 manager) reported using on the job follow up method respectively.

Output Index Method

Table 4 reported the discrepancies between the hotel managers and staff opinions about the similar used methods of performance measuring using the output indices. The popularity of employees depends on their satisfaction index and the guest complaint. While the hotel managers have been seen the service excellence and the quest satisfaction method are of paramount importance.

Table 4. Output Index Method in Hotel Case Study

The method used/frequencies	Managers	Employees
Guest satisfaction	5	0
Service Excellence	5	0
Reviewing guest problems	1	0
Employee satisfaction	0	80
Employee loyalty	0	3
Guest complaint	0	22
Daily (Espresso) report	0	6

Hotel Food and Beverage Performance Calculations

As the DEA handles many problems related to the previous measures by integrating several inputs and outputs concurrently. The operations research-based approach allows for both controllable and uncontrollable factors, generating a single close to the best performance index that relates all units being in comparison. Therefore, DEA allows for contingent efficiency calculation, which takes into consideration the performance of each hotel despite differing factors. This also allows hoteliers to use the best performers as the bases for benchmarking. The hard task to run LINGO is to prepare panel data sets for many inputs and outputs to get the purpose of it as benchmarking the best performing hotels with other of the lowest efficiency score as seen in table 5.

Table 5. Performance Ratio Using LINGO

Inputs	**Outputs**
The prime cost	Total net revenue
No of staff	
No of covers	Total profit

DMU No.	DMU (H4)	Input-Oriented CRS Efficiency	Sum of lambdas	RTS	Optimal Lambdas with Benchmarks					
1	2007	0.69	0.000	Increasing						
2	2008	0.74	0.742	Increasing	0.74	2008				
3	2009	1.00	1.031	Constant	0.10	2008	0.926	2010		
4	2010	0.96	1.039	Decreasing	0.22	2007	0.816	2010		
5	2011	1.00	0.975	Constant	0.97	2008				
6	2012	0.54	0.549	Decreasing	0.29	2007	0.067	2008	0.188	2010
7	2013	0.90	0.748	Increasing	0.26	2008	0.480	2010		
8	2014	0.55	0.675	Decreasing	0.21	2007	0.085	2008	0.381	2010
9	2015	0.91	1.055	Increasing	0.55	2007	0.501	2010		
10	2016	0.91	1.171	Constant	0.77	2007	0.398	2008		

As shown in table 5, 2009 and 2011 years emerged to be on the technical and cost efficiency frontier for all the years in the period under study with Hotel 4. However, in 2015 and 2016 the hotel has a similar technical and cost efficiency (0.91) scores. In 2010 hotel performance was supported to the next year 2011 as it was 0.96. This result is questionable because during 2011 all Egypt was affected by the Arab Spring based on the 25 January revolution. Hence, Egypt provides an opportunity for further empirical research to gain insights into the impacts of political crisis regarding hotel performance and profitability.

Interestingly, the performance ratio findings derived by LINGO and DEA during 2011 exactly deviate from the findings of Bougatef (2017) who found that during crises and corruption in Tunisia service market, the profitability decreased. Accordingly, this study found another contrary argument which will need further research and analysis.

Benchmarking the Performance Index Among the Hotel Cases

Table 6 showed the benchmarking using performance indices among the investigated hotels from the selected inputs/outputs.

Table 6. Benchmarking Using the Performance Indices among the Hotel Case Study

Year	**H 1**	**H2**	**H 3**	**H 4**
2007	69.3	29.0	79.3	0.69
2008	74.9	46.6	59.2	0.74
2009	88.7	46.5	67.1	1.00
2010	88.3	43.0	68.8	0.96
2011	35.5	40.5	48.7	1.00
2012	1.00	45.7	63.6	0.54
2013	64.6	46.9	35.5	0.90
2014	37.5	48.5	31.0	0.55
2015	79.9	46.3	79.3	0.91
2016	1.00	60.3	26.5	0.91

Regarding table 6, the performance ratio obtained for the four hotels in the case study through LINGO using DEA. It was used the relationship between total profit and revenue as outputs and prime cost, manpower and a total number of covers as inputs. Results showed that in hotel case 1

which is situated in Cairo (coded: H1) the lowest ratio was 35.5 in 2011 and the highest ratio was the frontier in 2016. H2 revealed that the lowest ratio was 29.5 in 2007 and the highest ratio was 60.34. This result is logic as this hotel situated in Sharm EL-Shiekh and it is running with a business segment and there is such improvement in his performance during 2016 as reported by their hotel executives.

The results of H3 showed that the lowest ratio was 26.5 in the year 2016 and the highest ratio was 79.30 in 2015 and 2007 as this hotel based in Alexandria, which depends on the local market. While H4 it was revealed the lowest ratio was 54 in 2012 and the highest ratio was the frontier in 2009 and 2011. Regarding the results of H4 as it is located in Cairo downtown, the highest year results in 2009 as it was before the Egyptian revolution and the same result was the frontier in 2011. However, this hotel has a very good reputation among competitors. This result refuted the previous research of Masa'deh et al. (2018) who reported that the hotel promotional mix in the Middle East is the most effective factor in hotel performance during crises times. Accordingly, further research should explore the most KPIs influences the declined performance.

Conclusions

The purpose of this research was to understand how to measure and then benchmark the hotel performance in general and in the food and beverage section in particular. The literature review's gap was identified first as there are many performance measurement techniques and little of them get a consensus from academics and hotel professionals, followed by reflecting this understanding to the hotel case study through a qualitative approach. Consequently, the conceptual dynamic model (figure 1) of the performance calculation was developed and composed from three main phases (identifying the existing performance measures, calculating the performance and finally benchmarking the performance ratio with others).

The research methodology implemented a case study with mixed-method choices. It uses 20 in-depth semi-structured interviews that were conducted with hotel managers. Multiple group discussions with hotel staff were conducted to explore which performance measuring technique was used in their daily operation. Archival analysis, observations, and simulation were also used to enrich the research dynamic model validity.

The qualitative analysis of interviews and previous literature simulation showed different subjective performance measuring techniques (forced choice, job rating checklists, BARS, 360-Degree and output index) according to the perception of both hotel managers and food and beverage staff as shown in table 3. However, balanced scorecards were not used at all. The quantitative analysis of the DEA scores using LINGO software showed examples in which hotel result in relatively high performance and in which year (2009 and 2011). What the results clearly showed is that the ability of hotels to succeed will not be determined by marketing factors, as assumed by Masa'deh et al. (2018) or external factors such as crises (Bougatef, 2017). Nevertheless, hotel performance is affected here in this case study by their costs, the number of employees and food and beverage revenue as being clear in the DEA output of table 5.

Theoretical Implications

One of the main theoretical contributions of this study is that the proposed dynamic model is considered an exertion added to the previously cited literature of Zaki et al. (2013). This conceptual model was tested and validated in this qualitative case study. Some cautions should

be taken into consideration in relation to its generalizability through the entire hotel sector in Egypt. Therefore, this study recommends extending our understandings by testing the model in another large context. Moreover, the methodology documented in this research relied on different data collection methods which increase the method validity through triangulation. This study contributed to methodology in research practice, many statistical techniques are also employed to measure the performance ratio using DEA and the recent technology applications of LINGO software, NVIVO, and Excel. As far as the researcher knows, this is one of the first studies, if any, that tested and validated a conceptual model intended to measure performance using a combination of the qualitative and quantitative performance measures.

Practical Implications

Interestingly, this dynamic model could be used for making comparisons between hotels. It is also considered a solid reference for hotel managers to reduce many employee-related costs by measuring their performance. The findings of the current case study provide interesting managerial and practical implications for the Egyptian hotel sector and in general and for the participated hotels in Egypt under investigation in particular. It concluded that the dynamic developed model could be used not only for measuring performance in FB sections, but also for improving and managing it. The conceptual model will help hotel sector practitioners to give them map streaming to better manage their performance. Once a decision is taken regarding which performance measure is to include in performance and DEA's calculations, the hotel managers should maintain and keep these performance calculations for regular comparisons and as a basis for making future improvements based on benchmarking the performance index. As well as in case of performance decline, the hotel resource or inputs should be revisited. The results have implications for hotel managers in that if they want to improve their performance, they need to benchmark their financial outcomes with competitors in a way that maximizes revenue. The results also indicated that DEA is a useful tool to identify factors impacting food and beverage departments' performance and could enhance the service data and revenue management regarding hotel performance in Egypt.

Research Limitations and Future Research Directions

This case study was limited to four hotels related to one hotel chain in Egypt. The researcher accessibility is the main concern due to time and cost considerations. It is also much focused on one specific section in hotels, which is food and beverage, albeit that this section is of paramount importance to the hotel performance. The generalizability of findings is also a limitation. However, further explorations and future research might involve a large-scale sample. Future research will be needed to gain better support to test the proposed framework by using a different method of research to evaluate different perspectives on performance in another hospitality context such as resorts or restaurants. It is also suggested to do further analyses to explore factors that highly affect the hotel performance using a pure positivist research paradigm.

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