International Journal of Heritage, Tourism and Hospitality

journal homepage: https://ijhth.journals.ekb.eg

The impact of applying electronic management systems (EMS) on food and beverage cost in five-star hotels in Cairo

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KEYWORDS

Management system
Food and beverage
Hotels
Cairo

ABSTRACT

Most institutions seek for improving the performance of their systems, which includes maintaining performance and reducing costs. A key strategy for achieving such goals is the effective implementation of electronic management systems. Also, previous research pointed out that there is a lack of research on the impact of applying electronic management systems on cost at the food and beverage department in hotel establishments. This research explores the impact of applying electronic management systems on food and beverage costs in five-star hotels. This research used questionnaires for collecting data. Four managers were investigated; food and beverage managers and their assistants cost control managers, and financial managers (n=112). Quantitative data obtained were statistically analyzed using SPSS (23). The findings revealed that electronic management systems have a positive effect on costs and developing operational performance. The main contribution of this research is to fill in the literature gap on the impact of electronic management on cost in the food and beverage department.

1. Introduction

Today, the world is dominated by an active movement of all modern technologies to develop the work of organizations and transform them into electronic organizations that use the internet and advanced applications to accomplish all their tasks and administrative transactions (Espacios and Autores, 2019).

Hotels began establishing their websites to accommodate customers worldwide by providing them access to hotel information through the Internet in the late 1990s. In the mid-to-late 2000s, hotel websites became available, and hotel managers focused on shifting from simply establishing a hotel website to improving their electronic management systems; since 2010, hotel managers have devoted considerable efforts to improving their business (Rahman, 2015).

Electronic management systems improve operations of the hotel industry, improve service production and delivery, and better control costs without reducing the level of service provided to the guest. This helps in decreasing organizational and service late, increasing guest and employee satisfaction and operational efficiency (Raab and Zemke, 2016)

Electronic management is not just transforming work systems and services into electronic systems only, but rather it is an intertwined and complex

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system that requires conscious studies of all elements of the system (Qayed and Labny, 2017)

The hotels' establishments are becoming more dependent on electronic management systems to provide better cost control and make management decisions more efficiently. Especially F&B cost control systems, as the F&B department is considered the second-largest profit center in hotels, representing about 30% of the total hotel revenue. Despite the great technological development, some food and beverage departments still use traditional methods to control costs. (Cho & Wong, 2000; Lamminmaki, 2008; Guilding et al., 2011).

And according to Ho et al, (2010) who stated that there are many advantages and benefits to be gained by the Food and Beverage department regarding the implementation of electronic management systems that significantly control costs. Also Siguaw et al, (2012), and Chan et al, (2018) reported that the application of electronic management systems is very little in the food and beverage sectors and the industry still needs more research in this area of research, given that hotel chains typically rely on electronic technologies more than independent hotels.

It is worth noting that in most of the studies, as mentioned, there is a lack of literature on the impact of the application of electronic management systems on the food and beverage department. Thus, the main objective of this research is to explore the impact of electronic management systems on F&B cost.

2. Literature Review

2.1. Importance of uses electronic management

Electronic management systems are an archiving unit of long-term storage management (Mccaskie, 2000; Rnal et al., 2007), which find indexed information, and knowledge, thus streamlining use and backup (Nengomasha & Chikomba, 2018; Xiao et al., 2019).

Jones (2008) and Arief (2015) stated that an electronic management system creates customer accounts automatically through the system because everything related to their financial transactions is recorded in the hotel's electronic file, it makes them to access information individually and follows it from time to time. This provides the ability to analyze information from various perspectives, which gives the hotel manager a high level of insight and this information can greatly help improve making a decision and use it to improve performance (Jones, 2008; Ip et al., 2011).

Bilgihan et al, (2011) mentioned that applying electronic management systems make services faster, fares cheaper, which contributed significantly to reducing labor costs, and providing products at the lowest costs.

Nengomasha & Chikomba, (2018) affirmed that electronic management system decreases the time, when the duration of service provision, review and receiving orders, and the sending documents are done in minutes instead of days.

Also Xu et al., (2019) added that electronic management system is important to simplify sharing of information in the various departments of the hotel establishment, which enhances the ability to control remotely and ease of sending files electronically.

2.2 Electronic management systems in food and beverage department

Changes that affect the evolution of supply and demand in the hotel sector are a clear indication of the role of e-management in the production, distribution, and promotion of hotel (Ivanov, 2019). The system of electronic management as a mechanism to rationalize the consumption of food and beverages represents a pivotal strategy that can give positive results to the work of hotel institutions and achieve a measure of credibility in the work of service organizations. by creating public institutions that are effective and efficient, responds to needs, and ensure equality in access to high-level services (Talla, 2020), and according to O'Connor, (2004) food and beverage e-management systems includes:

2.2.1 Conference and banqueting system

The conference and banqueting system assists in the management of the banquet department by accepting and storing reservations for events, tracking audio-visual and other equipment needs, coordinating the provision of services from the food and beverage department and simplifying the process of billing clients for services provided (Reffill, 2021). It also overcomes the most important obstacles to paperwork in that it facilitates access to data to verify reservation procedures, available stock, etc. which reduces paper transaction costs (Elaheh Yadegaridehkordi et al., 2018)

2.2.2 Recipe-costing system

Recipe-costing system tool for creating recipes the generates an accurate and up-to-date cost for individual dishes and complete menus; automatically recalculates the cost of all recipes when an ingredient price changes; Furthermore, the recipe detail reports include the cost of the ingredients used in the recipe, the amount, and the name, as it compares reports to identify cost problems in product manufacturing. Affordable costs and reducing waste are also updated according to customers desires, then the cost of changing ingredients is combined into recipes, thus updating the cost (de Oliveira, 2020; Burla & Chen, 2021).

2.2.3 Stock control system

In general hotel stock control systems should be able to tell where the inventory is in real-time, tracking of supplies and the updating of all inventory data, and a strategy for how much inventory to order and store, as well as when to re-order. These goals help departments in hotels to identify the effectiveness of their current stock control system and also if improvements are possible and where and how (Gaber, 2020).

2.2.4 Electronic point-of-sale system

Electronic point of sale system provide good links to control cost, inventory system allows categorizing food, keeping track of ingredients used and making reports, in addition it has an important role in reducing waste, which saves costs, as it alerts the chef in cases of shortage of materials good inventory count because it tracks the ingredients used in food and beverages and the ease of taking orders and modifying them (Tran et al., 2017).

2.2.5 Automated minibars

The automated minibars provide beverage facilities in bedrooms and automatically posts charges for items consumed to the guest's bill, in addition, there are some hotels that provide this service for free, which includes a selection of beverages among the items in the mini-bar. (Andriushchenko, 2020), in addition that checking automated minibar is one of the services that does not need human skills, because it is done automatically (Liu et al., 2020).

2.2.4 Menu engineering system

Menu engineering helps food and beverage managers to control labour costs without compromising the quality of service, as well some hospitality studies suggested that merge labor costs into menu item pricing, could be useful by selecting activities that have no added value and provide other ways to calculate costs by controlling overhead costs for individual product units, which helps with finer unit costing and pricing (Raab et al., 2008).

2.3. The impact of electronic management on costs

Electronic management systems refer to a collection of innovative strategies and apps that lead to behaviour change. It connects people to data in more effective and cost-effective ways than traditional software could ever do, and it is regarded as a valuable resource for business management in companies due to its effective role in solving business and personnel problems in novel ways (Prof and Ghany, 2019). There are many researchers who have addressed the impact of electronic management on costs and included that:

- Electronic management proved that it's a valuable tool and provides needed insight to calculate the food and beverage resource consumption with economic ways (Vaughn et al., 2010)
- Electronic management helps to correct the allocation of the costs to food production by adopting empirical methods of allocating, which minimizes the inefficient use of raw material. Leading to efficiency in using the material, and reducing production costs. (Gun awan et al., 2012)
- Electronic management put an end to some practices as intuitive pricing, incomplete costing methods, and methods based on materials alone or on the competition, without complete measurement of costs, by complete assessment of all costs to the production of food, labor costs, and administrative costs (Linassi et al., 2016)
- Using e-management to gauge how the hotel manages inventory, where facilitates monitoring inventory levels to reduce the expenses associated with acquiring, storing, maintaining, and ensure that stocks are kept to a bare minimum at all times (Gaber, 2020)

The establishments used e-management to save purchasing costs, which help to manage supplier relationships, streamline inventories and build a strategic advantage (Talla, 2020).

According to previous literature review the hypothesis are

H1: here is a positive effect of applying a conference and banqueting system on F&B costs in five-star hotels in Cairo.

H2: There is a positive effect of applying a recipe-costing system on F&B cost in five-star hotels in Cairo.

H3: There is a positive effect of applying stock control system on F&B cost in five-star hotels in Cairo.

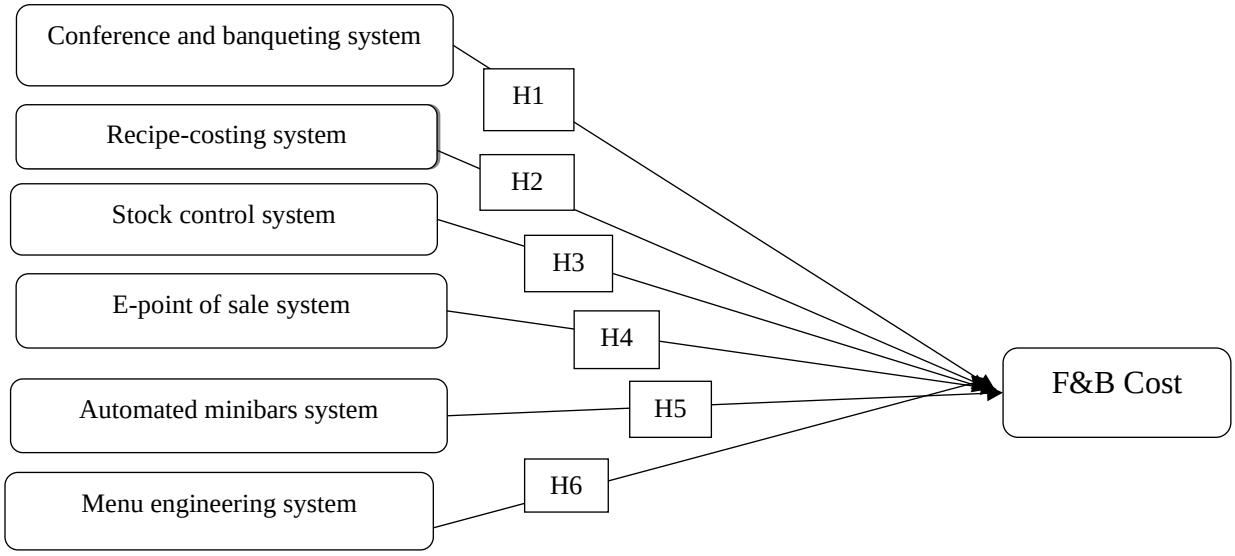
H4: There is a positive effect of applying an e-point of sale system on F&B cost in five-star hotels in Cairo.

H5: There is a positive effect of applying an automated minibars system on F&B cost in five-star hotels in Cairo.

H6: There is a positive effect of applying a menu engineering system on F&B cost in five-star hotels in Cairo.

Figure 1

Research Hypothesis



3. Methodology

The quantitative method was adopted in this research to evaluate the relation between electronic management systems and F&B cost in five-star hotels in Cairo. The research used descriptive analytical perspective, to achieve the research objectives.

The specific population of this study was all five-star hotels in Cairo, which are 28 hotels according to the statistics of the (Egyptian Hotels Association 2019/2020).

The research used the purposive sample where specific managers were selected to be study field. These managers are F&B managers, assistant F&B managers, cost control managers, and financial managers. These managers were selected due to more reasons as they are the most knowledgeable about this field, the cost control managers and financial have more experience with costs, and they are the most specialized in this area. Accordingly, the number of managers in the hotels under study is 112 managers (n {4*28} =112).

Questionnaire is used to collect data from five-star hotels in Cairo. The questionnaire is developed based on review of literature. The final questionnaire has (49) five-point Likert scale statements, ranging from 1 (strongly disagree) to 5 (strongly agree).

The questionnaire form is divided into three sections. The first section includes 4 statements to measure the demographic data of the respondents. The second section expresses electronic management systems in the food and beverage department techniques, which also divided into six main categories; conference and banqueting system (7 statements) (Reffill, 2021; OECD, 2005; Cheng et al., 2021). The recipe-costing system (6 statements) (Burla & Chen, 2021; Hoozée & Ngo,

2018; Raab & Zemke, 2016). Stock control system (5 statements) (Koubai & Bouyakoub, 2019; Devarajana & Jayamohan, 2016). Electronic point-of-sale system (8 statements) (Kipng et al., 2019; Yu et al., 2018). Automated minibars (5 statements) (Andriushchenko, 2020; Walker, 2017). Finally menu engineering system (8 statements) (Linassi et al., 2016; de Souza Vianna et al., 2020). While, the third section consists of 10 statements to measure impact of applying the electronic management systems on F&B cost (Shobaki et al., 2018, Safari et al., 2018, Talla, 2020, Burla & Chen, 2021).

The questionnaire was tested by distributing it to ten managers and ten academics to ensure that the purpose of the questionnaire is clear and that there are no repetitive or difficult statements. Then the quantitative analysis depended on (SPSS, version 23) software to analyses dat.

4. Finding and Discussion

4.1 Constructs Reliability and Validity

Table 1 indicates the reliability and validity of data.

Table 1

Cronbach's Alpha results

Main Questionnaire Items	Cronbach's Alpha
Conference and banqueting system	0.912
Recipe-costing system	0.926
Stock control system	0.915
Electronic point-of-sale system	0.947
Automated minibars	0.907
Menu engineering system	0.945
Food and beverage cost	0.965
Total	0.931

The results of Cronbach's alpha are greater than 0.7, which indicates that the construct reliability is fulfilled, and there is consistency and stability in the instrument.

4.2. Descriptive Analysis

Table (2) shows the frequency and percentage for demographic features of respondents in the research sample.

Table 2

Demographic Data Analysis

Variables	Categories	Frequencies	Percentages
Gender	**Male**	83	89.2%
	Female	10	10.8%
Number of years of experience	**less than 5 years**	14	15.1%
	from 5 to less than 10	25	26.9%
	from 10 to less than 15	26	28.0%
	more than 15 years	28	30.1%
Educational level	**Moderate**	8	8.6%
	B.Sc.	67	72.0%
	Postgraduate	18	19.4%
Position	**F&B manager**	24	25.8%
	Assistant F&B manager	23	24.7%
	Cost control manager	19	20.4%
	Financial manager	27	29.0%

Table (2) shows that (10.8%) of respondents are female while 83 (89.2%) are males which explains that the majority of respondents within the targeted hotels are males. However work experience years , the previous table shows that most respondents with a percentage (30.1%) of respondents are more than 15 years of experience, (28.0%) between 10 and 15 years, and (26.9%) of total respondents are between 5 and 10 years. Accordingly, most of the

respondents have more than 15 years of work experience.

Concerning the educational level, (72.0%) of the respondents hold a bachelor's degree, (19.4%) of respondents hold post graduate degree, and (8.6%) have moderate educational level. From what was mentioned, it is clear that the managers under study have a high level of education.

Regarding respondents position, (29.0%) of the respondents are financial managers, (25.8%) of respondents are F&B managers, (24.7%) of them are assistant F&B managers and (20.4%) of respondents are cost control manager.

4.2. Impact of applying electronic management systems in food and beverage departments on cost at five-star hotels in Cairo.

Table 3

Applying the conference and banqueting system

Applying the conference and banqueting system	Mean	Std Deviation
1. Easing resources allocation such as equipment	4.25	0.709
2. Simplifying the process of clients billing	4.26	0.793
3. Focusing on all elements related to the occasion	4.12	0.845
4. Simplifying communication between the employees and clients	4.15	0.833
5. Preparing contracts without making multiple phone calls	4.08	0.947
6. Coordinating between departments	4.23	0.898
7. Facilitating communication with suppliers	4.15	0.896
Total mean	4.17	0.845

The data shown in table (3) indicates that the total mean of the respondents' agreement on items of applying the conference and banqueting system is (4.17). This value is closer to respondents' agreement upon of importance applying the conference and banqueting system on food and beverage department. The value of the total standard deviation is (.845) which refers to there are no dispersion between the respondents' answers.

Table (3) indicates that the second statement mean value is (4.26) with standard deviations (.793) which are the greatest value, which reflects the respondents' agreement regarding to the points of (applying the conference and banqueting system make simplifying the process of clients billing). This may be consistent with what mentioned by Maringa & Maringa, (2009), and Reffill, (2021) they stated that the conference and banqueting systems have helped to streamline the way events are planned and run in the food and beverage department.

The previous table also indicates that the mean value (4.08) is the smallest value in the table with standard deviation (.947) which reflects the agreement of respondents on the point which states (applying the conference and banqueting system facilitate preparing contracts without making multiple phone calls). This agreed with what was affirmed by (Jeremen et al., 2016) who showed that using conference and banqueting systems facilitate communication between the sales employee and client, each of them in his office, answering all inquiries, verifying availability and preparing contracts.

Table (4):

Applying the recipe-costing system

Applying the recipe-costing system	**Mean**	**Std. Deviation**
1. Issuing compare reports to identify cost problems.	4.18	0.751
2. Minimizing and eliminating use unimportant ingredient.	4.22	0.735
3. Specifying standard portion sizes monitor the quality of product.	4.28	0.697
4. Improving operations such as services and operational efficiency.	4.22	0.806
5. Managing many menu items.	4.23	0.782
6. Making reports to manage the food item lists and determine the most profitable items.	4.32	0.740
Total mean	**4.23**	**0.745**

The results in table (4) show that the total mean of the respondents' agreement on the item of the recipe-costing system is (4.23). This value is closer to the values (agree, 4 and strongly agree 5) which

confirm respondents' agreement on the item of the importance applying the recipe-costing system in F&B department. Where the value of the standard deviation is (.745) which refers to there are no dispersion between the respondent's answers.

From table (4), the mean value (4.32) is the greatest value between the other values while its standard deviation value is (.740) which emphasize the respondents' agreement on the idea that applying the recipe-costing system facilitates making reports to manage the food item lists and ease determining the most profitable items. This is in line with what mentioned by Anene, (2017) who illustrated that the using of electronic management systems help F&B department to make influential decisions in monitoring purchases, issuing reports to manage the food item lists, and to determine the most profitable items.

According to table (4) it is clear that the mean value (4.18) is the smallest between the other values while standard deviation value equal (.705), this indicate the respondents' agreement on the idea of applying the recipe-costing system makes comparing reports more easier to identify cost problems. The automated recipe reports include the amount, name and cost of food ingredients, which identifies automatically food production problems and how to solve them easily. (Hoozée & Ngo, 2018)

Table 5

Applying stock control system

Applying stock control system	Mean	Std. Deviation
1. Managing stock and control the products flow.	4.26	0.793
2. Protecting against stock-out.	4.22	0.735
3. Keeping the appropriate stock level, to reduce the total annual stock cost.	4.24	0.799
4. Helping to keep inventory data up to date.	4.19	0.824
5. Easing inventory counting.	4.27	0.782
Total mean	**4.23**	**0.986**

The findings illustrated in the table (5) show that the total mean of the respondents' agreement on the importance of the stock control system is (4.23). This value is closer to the values (agree, 4 and strongly agree 5) which affirm the agreement of the respondents on importance applying the stock control system in F&B department. And this is confirmed by the value of the standard deviation (.986) which confirmed that there is no difference or dispersion between the answers of the respondents.

From the previous table, it is also clear that the value of the largest mean is (4.27), with a standard deviation of (.782). This clarifies the agreement of the respondents on the statement, which states that applying the stock control system easing inventory counting. This is consistent with what has been already referred to by Yemer & Chekol, (2017) who mentioned that manual inventory counting requires a lot of time, effort, and labor.

The results shown in table (5) show that the least mean is (4.19) with a standard deviation of (.824) This assures the respondents' general agreement on the statement, which states that applying the stock control system helping to keep inventory data up to date and protect store from stock-out. This may be consistent with what mentioned by Chukwudi Iwu et al., (2014) who stated that applying stock control system help to protect items from wastage, loss and breakage.

Table 6

Applying the electronic point-of-sale system

Applying the electronic point-of-sale system	**Mean**	**Std. Deviation**
1. Increasing managerial control.	4.27	0.768
2. Helping institutions to improve management and employee's performance.	4.27	0.782
3. Exploiting discounted prices through off-peak hours.	4.28	0.757
4. Displaying the most and the least selling dishes.	4.40	0.709
5. Tracking of ingredients used.	4.28	0.713
6. Taking orders and modifying them easily.	4.22	0.764
7. Increasing control on the guest's bill.	4.37	0.763
8. Making all necessary reports.	4.38	0.690
Total mean	**4.30**	**0.743**

The results presented in table (6) show that the total mean of the respondents' agreement on the importance of applying the electronic point-of-sale system is (4.30). This value is closer to the values (agree, 4 and strongly agree 5) which affirm the agreement of the respondents' on importance applying the stock control system in F&B department. And this is confirmed by the value of the standard deviation (.743) which referred to that there is no difference or dispersion between the answers of the respondents.

From the previous the table, it is also noticed that the mean value (4.40) is the largest values with a standard deviation of (.709). This value indicates that the respondents agreed on the sentence, which says (the displaying the most and the least selling dishes). This is consistent with what was determinedby Bulchand-Gidumal & Melián-González, (2015) , who assured that the usage of electronic point-of-sale system helps managers to determine the best-selling and least-selling dishes. This helps the management to take the appropriate decisions towards the selling market.

Table (6) also clear that the statement of (Taking orders and modifying them easily) has the smallest mean value (4.22) with a standard deviation value (.764). This indicates that taking orders and modifying them easily is one of the important advantages of applying the electronic point-of-sale system in the food and beverage department. This is agreed with what was mentioned by Tran et al., (2017) who noted that the usage of the electronic point of sale system providing a good linkage between F&B department and other departments , which helps to food control cost, food inventory categorization, customer invoice tracking, and reducing waste.

Table 7

Applying automated minibars

Applying automated minibars	**Mean**	**Std.Deviation**
1. Automatically posts charges for items consumed to the guest's bill.	4.26	0.779
2. Facilitating the re-fill of the minibar.	4.12	0.845
3. Increasing control over inventory.	4.09	0.830
4. Organizing reports with room number.	4.18	0.779
5. Solving incorrect charges problems.	4.23	0.782
Total mean	**4.17**	**0.803**

Data shown in table (7) illustrate that the total mean of using automated minibars systems is (4.17) and its standard deviation is (.803) This value is closer to the values (agree, 4 and strongly agree 5) which tends to the respondents' acceptance upon the importance of applying automated minibars.

From table (7) it is also clear that the mean value (4.26) is the largest values with a standard deviation (.779). This indicates the respondents' general agreement on the point that states that automated minibars where automatically posts charges for items consumed to the guest's bill. Noteworthy, these results shown above are complied with what was pointed by Asher, (2008) who affirmed that the automated minibars find out if all the items that the customer used have been added to his invoice.

With regard to table (7), it was also show that the mean value (4.09) with a standard deviation value (.830) is the smallest value. This refers to the respondents' general agreement on the statement (the automated minibars increased control over inventory at minibar). This is also agreed with what was stated by Asher, (2008), Kim, (2011) they mentioned that automated minibars making ensure the guest is charged for every item consumed, the minibar system making restocks easier. The minibar system provides a summary list of the items that must restock at all units. It also provides reports of the items are missed from each unit.

Table (8)

Impact of applying the menu engineering system

0	**Mean**	**Std. Deviation**
1. Controlling food and beverage costs through the menu items analysis.	4.06	0.832
2. Producing the largest menu items variety with the least cost.	4.05	0.852
3. Evaluating the Progress in current sales.	4.03	0.840
4. Evaluating the menu items and ability to meet guests needs	4.05	0.877

5. Analyzing food menus.	4.01	0.903
6. Helping managers to make their decisions with reliable reports.	4.18	0.884
7. Evaluating menu prices.	4.11	0.787
8. Reshape food ingredient sizes to ensure that they can achieve income.	4.03	0.890
Total mean	**4.06**	**0.746**

Table (8) indicates that the total mean of the respondents' agreement on the importance of applying the menu engineering system on F&B department is (4.06) This value is closer to the values (agree, 4 and strongly agree 5) which confirm the respondent's agreement toward this point. In addition, the value of the total standard deviation is (.746), which indicates that there is no difference or dispersion between the answers of the respondents.

Based on Table (8), it is also noticed that the mean value (4.18) is the largest among the values and with a standard deviation (.884). This value was relevant to the point that (Help managers make their decisions with reliable reports). This is consistent with what was mentioned by (Ardiansyah, 2020; de Souza Vianna et al., 2020) They have said that menu engineering system helps managers make decisions using reliable techniques and tools, as well as produce more products with fewer resources.

It is also noted from table (8) that the mean value (4.01) is the smallest among the values and its standard deviation is (903), which indicates the respondents' agreement on the statement that (the engineering menu system has the ability to analyze menus). This is in agreement with what was confirmed by Yiğitoğlu, (2020) who stated that the menu is evaluated by ordering items, as the analysis of the menus contributes in a way to improving the performance of the menu.

Table (9)

Impact of applying the electronic management systems on cost

Impact of applying the electronic management systems on F&B cost	Mean	Std. Deviation
1. Providing insight to calculate the food and beverage resource consumption with economic ways.	4.27	0.782
2. Minimizes the inefficient use of raw material.	4.26	0.765
3. Reducing the procedures that waste time.	4.35	0.789
4. Saving purchase costs.	4.27	0.823
5. Achieving maximum outcomes with little expenditures.	4.27	0.782
6. Reducing operations follow-up costs.	4.26	0.750
7. Helping managers to make more precise decisions.	4.30	0.805
8. Reducing the cost of communication.	4.25	0.761
9. Facilitating control operational costs.	4.30	0.749
10. Reducing labour costs by automation work.	4.22	0.858
Total mean	**4.27**	**0.792**

The data in table (9) show that the total mean of impact of applying the electronic management systems on F&B cost is (4.27) while its standard deviation is (.792). This indicates that most respondents agree on (the application of the electronic management systems impact on F&B cost positively).

According to table (9) it is also realized that the mean value (4.35) and its standard deviation is (.789) is the largest value among the values cleared in the previous table. This value related to the statement that (applying electronic management reducing the procedures that waste time which leads to cost reduction). The results agreed with what was mentioned Safari et al., (2018) confirmed that electronic management facilitates control of all transactions with other administrative entities by creative techniques that provide flexibility to respond the internal and external changes and to reduce the procedures that waste time, effort, and expenses.

From table (9), the mean value (4.22) and its standard deviation is (.858) is the smallest value among the shown values. This value related to the statement (Reducing labor costs by automation work). This explain that the application of the electronic management systems reduces labour costs by automation of work. These results agree with what was mentioned by (Safari et al., 2018; Shobaki et al., 2018; Qader et al., 2017), they

mentioned that the application of electronic management helps in quick access to the new consumer, tracking their behaviour, providing services and activities necessary for them to maintain customers and attract new customers as well.

Table 10

Model summary of the hypothesis

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.774[a]	0.599	0.571	0.44734

a. Predictors: (Constant), Menu, Stock, Conference, Minibars, Recipe, Point
b. Dependent Variable: Cost

In the above table (10), the R and R-square values. The R-value represents the correlation coefficient between the electronic management systems in F&B departments and cost. (R= 0.774). It indicates a strong positive correlation between the electronic management systems in F&B departments and cost.

From using regression analysis to measure the relation between the impact of applying electronic management system on food and beverage cost, table (10) revealed that the independent variable explains (0.599) of the variance in dependent variable due to (R square value = 59.9%).

Table 11

ANOVA analysis of the hypothesis

Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	25.683	6	4.280	21.390	0.000[b]
1 Residual	17.210	86	0.200		
Total	42.892	92			

a. Dependent Variable: Cost
b. Predictors: (Constant), Menu, Stock, Conference, Minibars, Recipe, Point.

In table (11) it was clear that ANOVA test revealed the value of (F) was (21.390) and ($p<0.05$) referring to a significant effect of the independent variable on the dependent one.

Table (12): Coefficient of the hypothesis

Model	Unstandardized Coefficients		Standardized Coefficients	T	ig.
	B	Std. Error	Beta		
(Constant)	0.612	0.370		1.655	0.000
Conference	0.606	0.098	0.424	4.462	0.000
Recipe	0.557	0.122	0.506	4.552	0.000
Stock	0.918	0.107	0.481	5.239	0.000
Point	0.238	0.145	0.217	1.635	0.000
Minibars	0.185	0.116	0.184	1.589	0.000
Menu	0.714	0.103	0.609	1.603	0.000

a. Dependent Variable: Cost

From Table (12) it is shown that the six variables of electronic management systems greatly influence the F&B cost. It is found that the implementation of conference and banqueting system significantly affects the F&B cost as (b= 0.606, and $p<0.05$). As a result, H1 is supported. Also, the application of recipe-costing system significantly affects the F&B cost as (b= 0.557, and $p<0.05$). Thus, H2 is also supported.

From table (12), H3 is supported, and implementation of stock control systems have a positive effect on F&B cost as (β=0. 918, $p<0.01$). H4 is also supported. So, applying e-point of sale have a positive effect on F&B cost as (β=0. 238, $p<0.05$).

Also, application of automated minibars was found positively affecting F&B cost. So H5 is supported as (β=0. 185, $p<0.01$). And H6 revealed that application of menu engineering system is positively affecting F&B cost as (β=0. 714, $p<0.01$)

And based on what was mentioned, all alternative hypotheses were accepted and the all null hypotheses were rejected

5. Recommendation

Attracting the professional and highly qualified staff in the area of the electronic systems services to benefit from their experience in activating and developing these systems.

Following the rapid development in the area of electronic systems to ensure the efficient performance of the food and beverage department. Updating the quality and type of application software versions and trying to replace old systems with advanced ones.

Organizing periodic training courses for employees of the F%B department to raise the efficiency of employees with regard to electronic management systems.

Granting material and moral rewards to employees who are distinguished in applying these systems to encourage F&B employees to apply electronic management systems.

Implementing menu rotation by activating the menu engineering system, this helps to know the most profitable dishes.

Controlling costs without compromising the quality of the product under any circumstances.

6. Limitation and Future Research

The current study gathered data from Egyptian The current study was limited to five-star hotels, and researchers in the future should apply the study subject to other types of hotels.

The electronic management systems and its influence on F&B cost can be applied to other sectors of hospitality, such as restaurants, catering establishments, and hospitals

The automated minibars have not received much attention from researchers, whereas most of the researchers discussed the traditional minibars without their automated shape.

Deep researches are required on the recipe-costing systems due to their importance in (forecasting - calculating and updating sales - pricing) fields.

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