A STUDY ON FOOD COST CONTROL – AN EMPIRICAL STUDY UNDERTAKEN IN A BUSINESS HOTEL, BANGALORE

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Abstract

Food costing refers to the process of calculating how much actually is spent in order to produce the food that is sold. Maintaining proper food cost is important because it is one of the best ways to make a restaurant financially successful. Since the hotel business is one of the most important dynamic industry having tight margins, fundamental financial concept that must be understood, controlled and manicured is the food cost. A study on food cost at Hotel Radha Regent, Bangalore has been undertaken in order to study food cost related to materials namely groceries, milk and cream, vegetables, imported fruits, poultry, sea food, meat, ice cream etc. issued to the kitchen and the cost percentage. Correlation and regression methods were used in this study to find out the weightage of issue of materials to kitchen with the food cost. The main challenge a hotel faces is to maintain an ideal food cost percentage which is 28%. The objective of this study includes the study of food cost percentage, association of materials issued to kitchen with food cost percentage and to identify which material issued to kitchen has more weightage on food cost at Radha Regent, Bangalore. The major finding of this study revealed that food cost percentage was too high (119.24%) in the month January 2015 and the weightage of groceries was found to be highly influencing the food cost. It was also observed that food cost was high on Jan. 10th and Jan. 13th, 2015. This indicated that the materials issued to kitchen, especially groceries should have been used effectively to take the revenues on those days.

Keywords: *food cost, issue of materials, weightage of groceries, revenues*

Introduction:

Cost control consists of sequence of steps a business uses to maintain proper control over its costs. Implementing this level of control can have a profound positive impact on profits over the long term. Controlling the cost is very important because "money saved is money earned". In hotel industry, the circle of managing costs begins from purchasing. From being aware of the processes involved to knowing the actual requirements of the kitchen, the purchase manager and his superiors need to always be on a vigil. The purchase costs for food and beverages are

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proportional to the total turnover of the establishment. As the business grows, so does the cost. Hence controlling costs is crucial and it is controllable.

More than ever, in restaurant business, one of tight margins and one of the most important fundamental margins that must be understood, controlled and manicured is food cost. Alcohol sales and food sales are the two main profit centres of just about any restaurant. In some cases it is the only profit centre. When restaurants are counting so much on food sales to generate enough gross profit to cover payroll, rent, insurance, costs of goods sold, repairs, marketing, utilities, administration, taxes and fees, and still have something left over to take home, they really want to be as effective as possible with how they should handle food costs. Food cost is technically referred to the costs of goods sold, in this case food, expressed as a percentage of what we sell it for. The average food cost in a month for hotels is 28%.

Knowing food cost is important because only if one knows the total cost, then the selling price of a dish can be fixed. The selling price is fixed in restaurants keeping in view the food cost. It also plays a major role in preparation of account and control of food cost where the regular review of production, sales and operating results, stocks of raw material and finished food and other items are valued at cost price or market price. The stock inventory is taken by physically verifying each item. After ascertaining the stocks and taking a note of costs and sales, the manager is able to control the food cost. The food cost accounting also helps management in formulating operating policies like what should be the food cost, whether to bake bakery products in house or out source. Even desserts can be bought from outside if the sale of the same is not sufficient to keep a dessert chef.

Major Hotel Industry Players:

The major players in the Indian hotel industry include a group of Indian-owned hotel chains and a few international chains as well. Of India's top five hotel chains, four are Indian-owned. ITDC Hotels is the only government-owned chain in the top five. It is interesting to note that most international hotel chains in India have adopted a strategy of entering the Indian market through franchises1 management contracts.

The hotels in India are categorised as below:

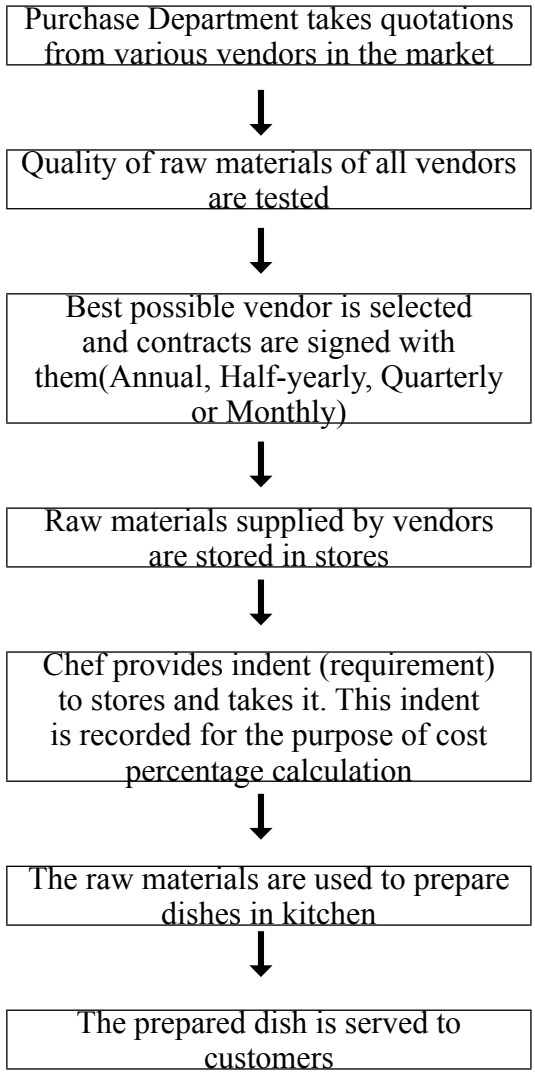
Category	Hotels	Rooms
5 Star - Deluxe	41	10574
5 Star	59	8028
4 Star	77	5586
3 Star	256	13231
2 Star	208	8023
1 Star	49	2472
Heritage	34	965
Approved Unclassified	112	6009
Sub-Total	836	54888
Unapproved	836	31486
Total	1672	86374

Standing proud in the heart of Electronics City- Bengaluru, Radha Regent, a four star business hotel elegantly mirrors the globalized persona of brand India. A modern showpiece of luxury and aesthetics, this premium business hotel artistically blends contemporary and classic design with warm hospitality. A wonderful lobby leads up to 104 spacious rooms with deluxe amenities-bath with separate walk-in shower cubicles, generous work area with hi-speed internet access, personal bar, individual air-conditioning control and multi-channel LED television.104 rooms / swimming pool / fitness centre / two F & B outlets / In room Dining / Banqueting and Conferencing area of 7500 sq. ft. with 3 meeting room and one Banquet hall / currency ex-change / travel car / doctor on call / gift shop / laundry service / in room safe locker.

It is one of Electronic city's most preferred business hotel. Located on the prime IT hub for today's discerning business traveler offering a quiet and relaxed atmosphere yet in close proximity to major industrial belts Bommasandra, Jigani, Anekal, Attibele&Hosur Industrial Area.The nature of business carried are food / meals, lodging, accommodation, catering and hospitality.

Workflow model:

An understanding of the work model at Radha Regent help in deriving the importance of food cost.



Need for the study:

The main goal of studying cost control is to have efficient control over the cost of dishes prepared in the hotel. This would automatically help in increased profits for the hotel.

1. To generate enough gross profit to cover payroll, rent, insurance, costs of goods sold, repairs, marketing,

utilities, administration, taxes and fees, etc.

2. To decrease the wastage.

3. To balance the menu.

4. To control the portion size because sometimes even small things can be the difference in meeting a target food cost.

e.g. each portion of a plate of biryani should contain 100 grams of rice and 3 chicken pieces and not any more.

Statement of the problem:

Every hotel, big or small has to control the cost. One of the major areas where the cost can be controlled is by controlling the food cost. No restaurant or hotel owner in today's environment can afford to ignore controlling costs of the food they prepare as it directly contributes to their profit.

The ideal food cost percentage in hotels is 28%. If the hotel incurs a food cost of say more than 40%, it indicates that the food is not being prepared effectively and hence loss occurs. If the food cost is too low, say, less than 15%, then it means either the guest is given a small portion or he is served sub-standard quality of food. It will subsequently result in losing permanent customers and hence will reduce sale and profit.

Literature Review:

Polansky & Mecool (1991) has discussed a frecasting methodology based on a statistic called the Capture Ratio in the place of the traditional covers per occupied room statistic which was developed and implemented by the Stouffer Orlando Resort.

Juvan, Grun, & Doinicar (2017) attempted to measure food waste at a hootel breakfast buffet and identified certain guest and breakfast characteristics significantly associated with higher plate waste.

Research work in the area of food cost is found to be rare and hence the present study is undertaken.

Objectives of the study:

1. To study the food cost percentage at HotelRadha Regent, Bangalore for a period of 12 months from Jan. 2015 to Dec. 2015.

2. To study the association between materials issued to the kitchen and the cost percentage.

3. To identify the weightage of materials issued to the kitchen with the food cost.

Research Methodology:

The data of the study was collected from the records maintained in the organization. Secondary data was collected from finance executive and discussion with the various concerned personnel in different departments to understand their system of operation and the methods adopted

at various levels. The study period was January-December 2015.The statistical tools used in this study are Correlation and Regression.

Limitations of the study:

1. This study concentrates only on the control of food cost and no other costs.
2. The cost of the basic raw material varies from season to season. In off season, the cost of raw material is always high.
3. The ordering cost of large quantity of goods (raw material) is much less than the ordering cost of small quantity of goods (raw material).
4. The price of raw material may always go high during the shortage of goods in the market due to high consumption or low production.

Data analysis and Interpretation:

The food cost percentage is calculated in order to assess the effective utilization of materials issued to the kitchen such as groceries, milk & cream, vegetables, poultry, sea food, meat, fruits, ice cream etc.

The calculation of food cost percentage is as shown below.

$$\text{Food Cost \%} = \frac{\text{Total materials issued to kitchen}}{\text{Total of revenues generated}}$$

Table 1 (a): Calculation of food cost % on Jan. 01, 2015

DATE	1-Jan-15		
GROSS FOOD COST REPORT			
SALE	TODAY	TODATE	BUDGET
THE LOBBY CAFÉ	28908	28908	38468
ROOM SRVCE	3390	3390	2419
AURA	0	0	6290
TAKE AWAY	0	0	6484
BANQUET	0	0	53226
MINI BAR	500	500	1290
PLAN AMT TLC	5250	5250	25806
PLAN AMT BAN		0	0
DISCOUNT		0	0
TOTAL	**38048**	**38048**	**133983**
ISSUE			
GROCERIES	7,593.56	7594	19.96%
MILK & CREAM	3063.70	3064	8.05%
VEGETABLE EXOTIC	16.00	16	0.04%
FRUITS IMPORTED	0.00	0	0.00%
POULTRY	1434.00	1434	3.77%
SEA FOOD	1100.00	1100	2.89%
MEAT	5250.00	5250	13.80%
VEGETABLE	4740.00	4740	12.46%
FRIUTS	2085.00	2085	5.48%
ICE CREAMS	0.00	0	0.00%
TOTAL	**25282.26**	**25282.26**	**66.45%**
Kitchen Fuel issued	40.00	40	
Kitchen Fuel COST %	**0.11%**	**0.11%**	
COST %	**66.45%**	**66.45%**	28.0%

Table 1(b): Food Cost % of all months

Months	Food Cost %
Jan. 2015	119.24%
Feb. 2015	49.46%
Mar. 2015	24.12%
Apr. 2015	70.57%
May. 2015	15.13%
June 2015	33.40%
July 2015	27.30%
Aug. 2015	38.43%
Sept. 2015	26.87%
Oct. 2015	28.63%
Nov. 2015	36.95%
Dec. 2015	40.20%

The food cost percentage was too high in the month of January (i.e. 119.24%), which was more than 4 times the ideal food cost percentage of 28% and hence it indicates that more food is being wasted or food is not supplied in correct portion. Food cost was slightly on the higher side for the months February, April, and December too with 49.46%, 70.57% and 40.20% respectively.

The hotel has been performing fairly in the months of March, June, July, August, September, October and November with 24.12%, 33.40%, 27.30%, 38.43%, 26.87%, 28.63% and 36.95% respectively. However the hotel has been operating with a low food cost % in the month of May with 15.13%.

Using correlation, the association of various materials issued to the kitchen such as groceries, milk & cream, vegetables, poultry, sea food, meat, fruits, ice cream etc. with the cost % has been analysed. The weightage of various materials issued to the kitchen such as groceries, milk & cream, vegetables, poultry, sea food, meat, fruits, ice cream etc. with the cost % has been analysed monthly with the help of regression.The following hypothesis has been tested.

Testing of Hypotheses:

Ho: There is no significant relationship between materials issued to kitchen and cost %.

Table 2: Correlation for materials issued to kitchen for the month January and the cost percentage

	Groce-ries	Milk & Cream	Vegetables exotic	Fruits imported	Poultry	Sea Food	Meat	Vegetables	Fruits	Ice Cream	Kitchen Fuel	Cost %
Groceries	1											
Milk & Cream	0.74	1										
Vegetables exotic	0.64	0.48	1									
Fruits imported	0.41	0.23	0.64	1								
Poultry	0.85	0.91	0.57	0.43	1							
Sea Food	0.54	0.38	0.67	0.38	0.55	1						
Meat	0.63	0.25	0.56	0.38	0.53	0.69	1					
Vegetables	0.85	0.88	0.64	0.35	0.87	0.48	0.5	1				
Fruits	0.6	0.28	0.59	0.77	0.49	0.45	0.64	0.51	1			
Ice Cream	0.29	0.00	0.17	0.12	0.08	0.31	0.07	0.03	0.11	1		
Kitchen Fuel	0.36	0.22	0.39	0.25	0.34	0.5	0.56	0.32	0.42	0.06	1	
Cost%	0.36	0.35	0.28	0.31	0.31	-0.1	0.15	0.47	0.49	-0.23	-0.06	1

Table 2 shows that that issue of seafood, ice cream and kitchen fuel are negatively associated with the food cost and all other the issues to the kitchen are positively associated

Table 3: Regression for materials issued to kitchen for the month January and the cost percentage

Groceries	Coefficients	P-Value
Milk & Cream	0.54703	0.01697
Milk & Cream	2.25E-06	0.81329
Vegetables exotic	7.34E-06	0.73267
Fruits imported	0.00027	0.69018
Poultry	8.47E-05	0.63875
Sea Food	1.22E-05	0.59946
Meat	2.24E-05	0.29995
Vegetables	4.70E-06	0.87743
Fruits	1.92E-05	0.48001
Ice Cream	9.59E-05	0.04904
Kitchen Fuel	1.21E-05	0.315503

Table 3 indicates that groceries have more weightage against the food cost %. It is also evident that p value is < 0.05 for groceries and ice cream and hence indicates a strong evidence against null hypothesis. Hence the null hypothesis is rejected. Since p value > 0.05 for milk & cream, vegetables exotic, fruits imported, poultry, sea food, meat, vegetables, fruit and kitchen fuel, null hypothesis is accepted

Table 4: Correlation between materials issued to kitchen for the month February and the cost percentage

	Groce-ries	Milk & Cream	Vegetables exotic	Fruits imported	Poultry	Sea Food	Meat	Vegetables	Fruits	Ice Cream	Kitchen Fuel	Cost %
Groceries	1											
Milk & Cream	0.46	1										
Vegetables exotic	0.48	0.41	1									
Fruits imported	0.51	0.46	0.42	1								
Poultry	0.66	0.42	0.21	0.16	1							
Sea Food	0.47	0.58	0.43	0.19	0.54	1						
Meat	0.53	0.47	0.59	0.09	0.58	0.62	1					
Vegetables	0.44	0.41	0.68	0.62	0.11	0.32	0.38	1				
Fruits	0.59	0.25	0.51	0.77	0.34	0.16	0.22	0.63	1			
Ice Cream	0.16	0.26	0.28	0.11	0.16	0.37	0.17	0.18	0.24	1		
Kitchen Fuel	0.38	0.22	0.39	0.25	0.34	0.5	0.56	0.32	0.42	0.07	1	
Cost%	0.14	-0.34	-0.1	0.33	-0.31	-0.4	-0.28	0.23	0.43	-0	0.25	1

It is evident from Table 4 that milk & cream, vegetables exotic, poultry, seafood, meat and kitchen fuel issues are negatively associated with the food cost and all other the issues to the kitchen are positively associated.

Table 5: Materials issued to kitchen for the month February and the cost percentage – Results of Regression

Groceries	Coefficients	P-Value
Milk & Cream	0.386	5.7E-05
Milk & Cream	9.92E-06	0.035
Vegetables exotic	1.47E-05	0.111
Fruits imported	0.000592	0.07735
Poultry	3.591E-05	0.73538
Sea Food	2.207E-05	0.02430
Meat	6.70E-06	0.50271
Vegetables	5.737E-06	0.55925
Fruits	9.003E-06	0.53623
Ice Cream	5.316E-05	0.16912
Kitchen Fuel	8.468E-06	0.51188

From the above table it is evident that groceries have more weightage against the food cost %. It is also evident that p value is < 0.05 for groceries and sea food and hence indicates strong evidence against null hypothesis. Hence the null hypothesis is rejected. Since p value > 0.05 for milk & cream, vegetables exotic, fruits imported, poultry, meat, vegetables, fruit, ice cream and kitchen fuel, null hypothesis is accepted for these items.

Table 6: Correlation for materials issued to kitchen for the month March and the cost percentage

	Groce-ries	Milk & Cream	Vegetables exotic	Fruits imported	Poultry	Sea Food	Meat	Vegetables	Fruits	Ice Cream	Kitchen Fuel	Cost %
Groceries	1											
Milk & Cream	0.53	1										
Vegetables exotic	0.29	0.24	1									
Fruits imported	0.67	0.32	0.56	1								
Poultry	0.55	0.68	0.22	0.30	1							
Sea Food	0.40	0.69	0.05	0.26	0.74	1						
Meat	0.31	0.49	0.17	0.07	0.62	0.48	1					
Vegetables	0.74	0.48	0.74	0.76	0.42	0.33	0.24	1				
Fruits	0.72	0.42	0.66	0.75	0.25	0.17	0.17	0.87	1			
Ice Cream	-0.04	-0.29	-0.11	-0.02	-0.23	-0.23	-0.03	-0.02	0.09	1		
Kitchen Fuel	0.46	0.63	0.36	0.33	0.53	0.53	0.28	0.41	0.38	-0.28	1	
Cost%	0.23	-0.19	0.33	0.34	-0.23	-0.23	-0.39	0.49	0.58	0.32	-0.09	1

From the above table it is evident that milk & cream, poultry, seafood, meat and kitchen fuel issues are negatively associated with the food cost and all other the issues to the kitchen are positively associated.

Table 7: Regression for materials issued to kitchen for the month March and the cost percentage

Groceries	Coefficients	P-Value
Milk & Cream	1.602	0.22
Milk & Cream	7.43E-05	0.05
Vegetables exotic	0.0005	0.32
Fruits imported	0.0004	.05
Poultry	2.03E-05	0.41
Sea Food	6.71E-06	0.72
Meat	5.11E-05	0.01
Vegetables	8.38-05	0.76
Fruits	0.0002	0.12
Ice Cream	2.27E-06	0.96
Kitchen Fuel	0.117	0.51

Table 7 indicates that it is evident that groceries have more weightage against the food cost %. It is also evident that p value is < 0.05 for milk & cream, imported fruits, meat and fruits and hence indicates strong evidence against null hypothesis. Hence the null hypothesis is rejected. Since p value > 0.05 for groceries, vegetables exotic, poultry, sea food, vegetable, ice creams and kitchen fuel, null hypothesis is accepted.

Table 8: Correlation for materials issued to kitchen for the month April and the cost percentage

	Groce-ries	Milk & Cream	Vegetables exotic	Fruits imported	Poultry	Sea Food	Meat	Vegetables	Fruits	Ice Cream	Kitchen Fuel	Cost %
Groceries	1											
Milk & Cream	0.74	1										
Vegetables exotic	0.66	0.68	1									
Fruits imported	0.53	0.82	0.66	1								
Poultry	0.74	0.74	0.69	0.62	1							
Sea Food	0.61	0.77	0.68	0.85	0.81	1						
Meat	0.74	0.88	0.75	0.68	0.85	0.78	1					
Vegetables	0.63	0.56	0.72	0.66	0.68	0.68	0.57	1				
Fruits	0.69	0.65	0.59	0.67	0.66	0.63	0.58	0.86	1			
Ice Cream	0.43	0.66	0.49	0.63	0.43	0.46	0.69	0.26	0.25	1		
Kitchen Fuel	0.36	0.21	0.39	0.25	0.34	0.50	0.56	0.32	0.42	0.07	1	
Cost%	0.40	0.68	0.47	0.78	0.29	0.36	0.53	0.24	0.40	0.60	0.25	1

From the above table it is evident that none of the issues to kitchen are negatively associated with the food cost and hence all the issues to the kitchen are positively associated.

Table 9: Results of regression analysis for materials issued to kitchen for the month April and the cost percentage.

Groceries	Coefficients	P-Value
Milk & Cream	1.589	0.23
Milk & Cream	8.09E-07	0.94
Vegetables exotic	7.46E-05	0.05
Fruits imported	0.0005	0.33
Poultry	0.0004	0.05
Sea Food	1.95E-05	0.47
Meat	5.09E-05	0.01
Vegetables	8.40E-05	0.08
Fruits	0.0002	0.12
Ice Cream	1.89E-06	0.96
Kitchen Fuel	0.114	0.53

From the above table it is evident that groceries have more weightage against the food cost %.It is also evident that p value is < 0.05 for vegetables, meat and fruits and hence indicates strong evidence against null hypothesis. Hence the null hypothesis is rejected. Since p value > 0.05 for groceries, milk & cream, vegetables exotic, fruits imported, poultry, sea food, ice cream and kitchen fuel, null hypothesis is accepted.

Table 10: Correlation between materials issued to kitchen for the month May and the cost percentage

	Groce-ries	Milk & Cream	Vegetables exotic	Fruits imported	Poultry	Sea Food	Meat	Vegetables	Fruits	Ice Cream	Kitchen Fuel	Cost %
Groceries	1											
Milk & Cream	0.57	1										
Vegetables exotic	0.49	0.38	1									
Fruits imported	0.46	0.39	0.37	1								
Poultry	0.77	0.63	0.41	0.41	1							
Sea Food	0.60	0.52	0.36	0.50	0.83	1						
Meat	0.59	0.46	0.24	0.32	0.79	0.78	1					
Vegetables	0.63	0.55	0.7	0.60	0.9	0.52	0.42	1				
Fruits	0.52	0.46	0.55	0.84	0.41	0.48	0.37	0.74	1			
Ice Cream	0.10	0.05	-0.19	-0.07	0.10	0.007	0.30	-0.08	0.28	1		
Kitchen Fuel	-0.16	-0.25	-0.06	-0.22	-0.26	-0.20	-0.26	-0.25	-0.27	0.17	1	
Cost%	0.07	0.002	0.14	0.06	-0.29	-0.29	-0.25	0.13	0.19	0.33	0.37	1

Table 10 indicates that poultry, seafood and meat issues are negatively associated with the food cost and all other the issues to the kitchen are positively associated.

Table 11: Results of regression analysis for materials issued to kitchen for the month May and the cost percentage

Groceries	Coefficients	P-Value
Milk & Cream	1.515	0.24
Milk & Cream	1.43E-07	0.08
Vegetables exotic	1.50E-05	0.47
Fruits imported	9.54E-06	0.98
Poultry	7.83E-06	0.96
Sea Food	5.77E-05	0.04
Meat	1.24E-06	0.95
Vegetables	9.51E-06	0.59
Fruits	3.19E-05	0.24
Ice Cream	1.22E-05	0.81
Kitchen Fuel	7.28E-05	0.03

From the above table it is evident that groceries have more weightage against the food cost %.It is also evident that p value is < 0.05 for sea food and kitchen fuel and hence indicates strong evidence against null hypothesis. Hence the null hypothesis is rejected. Since p value > 0.05 for groceries, milk & cream, vegetables exotic, fruits imported, poultry, meat, vegetable, fruits and ice creams, null hypothesis is accepted.

Table 12: Correlation between materials issued to kitchen for the month June and the cost percentage

	Groce-ries	Milk & Cream	Vegetables exotic	Fruits imported	Poultry	Sea Food	Meat	Vegetables	Fruits	Ice Cream	Kitchen Fuel	Cost %
Groceries	1											
Milk & Cream	0.46	1										
Vegetables exotic	0.55	0.57	1									
Fruits imported	0.36	0.38	0.61	1								
Poultry	0.30	0.31	0.36	-0.06	1							
Sea Food	0.20	0.11	0.001	-0.27	0.71	1						
Meat	0.30	0.23	0.16	0.02	0.54	0.44	1					
Vegetables	0.63	0.55	0.80	0.44	0.37	0.08	0.20	1				
Fruits	0.62	0.42	0.76	0.83	0.19	-0.12	0.19	0.63	1			
Ice Cream	0.10	-0.19	0.17	0.005	0.10	-0.15	0.03	0.34	0.13	1		
Kitchen Fuel	-0.03	0.19	0.14	0.17	-0.12	-0.13	0.02	0.008	0.05	0.061	1	
Cost%	-0.05	-0.15	0.01	0.31	-0.14	-0.03	0.17	-0.11	0.21	-0.22	014	1

Table 12 reveals that groceries, milk & cream, poultry, sea food, vegetables and ice cream are negatively associated with the food cost and all other the issues to the kitchen are positively associated.

Table 13: Results of regression analysis for materials issued to kitchen for the month June and the cost percentage

Groceries	Coefficients	P-Value
Milk & Cream	0.129	0.76
Milk & Cream	2.71E-07	0.58
Vegetables exotic	3.26E-05	0.16
Fruits imported	3.26E-05	0.96
Poultry	0.0001	0.44
Sea Food	1.19E-05	0.47
Meat	6.12E-06	0.58
93Vegetables	1.52E-05	0.17
Fruits	1.83E-06	0.93
Ice Cream	1.99E-05	0.65
Kitchen Fuel	2.48E-05	0.26

Table 13 shows that groceries have more weightage against the food cost %.It is also evident that p value is not < 0.05 for any of the issues and hence indicates weak evidence against null hypothesis. Hence the null hypothesis is accepted for all issues to kitchen such as groceries, milk & cream, vegetables exotic, fruits imported, poultry, sea food, meat, vegetable, fruits, ice creams and kitchen fuel.

Table 14: Correlation between materials issued to kitchen for the month July and the cost percentage

	Groce-ries	Milk & Cream	Vegetables exotic	Fruits imported	Poultry	Sea Food	Meat	Vegetables	Fruits	Ice Cream	Kitchen Fuel	Cost %
Groceries	1											
Milk & Cream	0.42	1										
Vegetables exotic	0.36	0.16	1									
Fruits imported	0.52	0.05	0.49	1								
Poultry	0.49	0.55	0.14	0.31	1							
Sea Food	0.51	0.49	0.01	0.32	0.78	1						
Meat	0.16	0.26	0.05	0.30	0.52	0.50	1					
Vegetables	0.48	0.36	0.8	0.66	0.48	0.35	0.22	1				
Fruits	0.54	0.31	0.72	0.71	0.38	0.29	0.17	0.90	1			
Ice Cream	0.02	0.11	0.13	-0.07	-0.12	0.02	0.17	0.02	0.01	1		
Kitchen Fuel	-0.38	0.11	0.002	-0.06	-0.04	-0.06	0.24	-0.03	-0.08	-0.27	1	
Cost%	0.22	-0.07	0.40	0.18	-0.35	-0.41	-0.34	0.18	0.26	-0.06	-0.11	1

The above table points that milk & cream, poultry, sea food, meat, ice cream and kitchen fuel issues are negatively associated with the food cost and all other the issues to the kitchen are positively associated.

Table 15: Results of regression analysis for materials issued to kitchen for the month July and the cost percentage

Groceries	Coefficients	P-Value
Milk & Cream	0.686	0.63
Milk & Cream	1.08E-05	0.11
Vegetables exotic	8.24E-06	0.69
Fruits imported	0.0004	0.46
Poultry	0.0001	0.63
Sea Food	2.82E-05	0.17
Meat	2.35E-06	0.23
93Vegetables	5.79E-07	0.97
Fruits	7.38E-07	0.98
Ice Cream	2.35E-05	0.64
Kitchen Fuel	2.34E-05	0.35

From the above table it is evident that groceries have more weightage against the food cost %.It is also evident that p value is not < 0.05 for any of the issues and hence indicates weak evidence against null hypothesis. Hence the null hypothesis is accepted for all issues to kitchen such as groceries, milk & cream, vegetables exotic, fruits imported, poultry, sea food, meat, vegetable, fruits, ice creams and kitchen fuel.

Table 16: Correlation between materials issued to kitchen for the month August and the cost percentage

	Groce-ries	Milk & Cream	Vegetables exotic	Fruits imported	Poultry	Sea Food	Meat	Vegetables	Fruits	Ice Cream	Kitchen Fuel	Cost %
Groceries	1											
Milk & Cream	0.68	1										
Vegetables exotic	0.51	0.46	1									
Fruits imported	0.51	0.44	0.28	1								
Poultry	0.64	0.60	0.36	0.48	1							
Sea Food	0.40	0.48	0.52	0.37	0.47	1						
Meat	0.38	0.51	0.29	0.38	0.68	0.63	1					
Vegetables	0.58	0.52	0.78	0.43	0.64	0.44	0.53	1				
Fruits	0.62	0.48	0.47	0.72	0.64	0.32	0.35	0.69	1			
Ice Cream	-0.09	0.08	-0.07	-0.09	0.08	0.04	0.24	-0.00	0.07	1		
Kitchen Fuel	0.22	-0.01	0.12	-0.04	0.23	0.27	0.25	0.13	0.04	0.08	1	
Cost%	0.17	0.02	0.31	0.10	-0.07	0.25	0.27	0.32	0.06	-0.10	-0.07	1

Correlation between materials issued to kitchen for the month August and the cost percentage revealthat poultry, ice cream and kitchen fuel issues are negatively associated with the food cost and all other the issues to the kitchen are positively associated.

Table 17: Results of regression analysis for materials issued to kitchen for the month August and the cost percentage

Groceries	Coefficients	P-Value
Milk & Cream	2.32	0.09
Milk & Cream	1.46E-07	0.06
Vegetables exotic	5.92E-05	0.12
Fruits imported	4.64E-05	0.96
Poultry	6.30E-05	0.80
Sea Food	7.05E-05	0.01
Meat	1.11E-06	0.62
93Vegetables	7.21E-05	0.04
Fruits	4.49E-06	0.26
Ice Cream	6.41E-05	0.88
Kitchen Fuel	1.62E-05	0.59

From the above table it is evident that groceries have more weightage against the food cost %.It is evident that p value is < 0.05 for sea food and vegetables and hence indicates strong evidence against null hypothesis. Hence the null hypothesis is rejected. Since p value > 0.05 for groceries, milk & cream, vegetables exotic, fruits imported, poultry, meat, fruits, ice creams and kitchen fuel, null hypothesis is accepted.

Table 18: Correlation between materials issued to kitchen for the month September and the cost percentage

	Groce-ries	Milk & Cream	Vegetables exotic	Fruits imported	Poultry	Sea Food	Meat	Vegetables	Fruits	Ice Cream	Kitchen Fuel	Cost %
Groceries	1											
Milk & Cream	0.63	1										
Vegetables exotic	0.44	0.47	1									
Fruits imported	0.17	0.21	0.26	1								
Poultry	0.51	0.43	0.25	-0.00	1							
Sea Food	0.41	0.48	0.24	-0.12	0.72	1						
Meat	0.40	0.38	0.26	0.06	0.82	0.67	1					
Vegetables	0.54	0.52	0.79	0.58	0.40	0.29	0.43	1				
Fruits	0.52	0.59	0.81	0.44	0.26	0.28	0.27	0.89	1			
Ice Cream	0.20	0.12	0.20	0.32	0.03	-0.08	0.07	0.25	0.12	1		
Kitchen Fuel	-0.11	0.17	0.02	-0.14	-0.25	0.25	-0.18	-0.08	0.07	-0.26	1	
Cost%	0.07	-0.14	0.30	0.18	-0.40	-0.33	-0.38	0.17	0.19	-0.05	0.14	1

From the above table it is evident that milk & cream, poultry, sea food, meat and ice cream issues are negatively associated with the food cost and all other the issues to the kitchen are positively associated.

Table 19: Results of regression analysis for materials issued to kitchen for the month September and the cost percentage:

Groceries	Coefficients	P-Value
Milk & Cream	1.310	0.59
Milk & Cream	2.39E-05	0.07
Vegetables exotic	5.31E-05	0.18
Fruits imported	0.0022	0.10
Poultry	0.0001	0.57
Sea Food	2.86E-05	0.42
Meat	1.39E-06	0.63
93Vegetables	1.60E-05	0.61
Fruits	2.63E-06	0.65
Ice Cream	7.24E-05	0.42
Kitchen Fuel	5.85E-05	0.25

From the above table it is evident that groceries have more weightage against the food cost %.

It is also evident that p value is not < 0.05 for any of the issues and hence indicates weak evidence against null hypothesis. Hence the null hypothesis is accepted for all issues to kitchen such as groceries, milk & cream, vegetables exotic, fruits imported, poultry, sea food, meat, vegetable, fruits, ice creams and kitchen fuel.

Table 20: Correlation for materials issued to kitchen for the month October along with the cost percentage

	Groce-ries	Milk & Cream	Vegetables exotic	Fruits imported	Poultry	Sea Food	Meat	Vegetables	Fruits	Ice Cream	Kitchen Fuel	Cost %
Groceries	1											
Milk & Cream	0.56	1										
Vegetables exotic	0.43	0.26	1									
Fruits imported	0.60	0.57	0.45	1								
Poultry	0.65	0.65	0.44	0.52	1							
Sea Food	0.49	0.66	0.34	0.22	0.79	1						
Meat	0.59	0.50	0.38	0.37	0.66	0.70	1					
Vegetables	0.64	0.40	0.69	0.69	0.70	0.47	0.49	1				
Fruits	0.67	0.57	0.52	0.88	0.59	0.32	0.39	0.76	1			
Ice Cream	0.30	0.28	0.10	0.03	0.17	0.35	0.14	0.24	0.18	1		
Kitchen Fuel	-0.23	0.24	-0.17	0.12	0.03	0.16	0.00	-0.17	0.03	-0.29	1	
Cost%	0.09	0.12	0.20	0.36	-0.00	-0.12	-0.00	0.19	0.21	0.00	0.03	1

From the above table it is evident that poultry, sea food and meat issues are negatively associated with the food cost and all other the issues to the kitchen are positively associated.

Table 21: Results of regression analysis for materials issued to kitchen for the month October and the cost percentage:

Groceries	Coefficients	P-Value
Milk & Cream	0.897	0.84
Milk & Cream	2.16E06	0.91
Vegetables exotic	5.18E-05	0.62
Fruits imported	0.0010	0.51
Poultry	0.0016	0.19
Sea Food	2.44E-05	0.79
Meat	6.08E-05	0.57
93Vegetables	1.64E-06	0.97
Fruits	3.60E-05	0.69
Ice Cream	0.0002	0.25
Kitchen Fuel	5.46E-05	0.61

From the above table it is evident that groceries have more weightage against the food cost %.It is also evident that p value is not < 0.05 for any of the issues and hence indicates weak evidence against null hypothesis. Hence the null hypothesis is accepted for all issues to kitchen such as groceries, milk & cream, vegetables exotic, fruits imported, poultry, sea food, meat, vegetable, fruits, ice creams and kitchen fuel.

Table 22: Correlation for materials issued to kitchen for the month November along with the cost percentage

	Groce-ries	Milk & Cream	Vegetables exotic	Fruits imported	Poultry	Sea Food	Meat	Vegetables	Fruits	Ice Cream	Kitchen Fuel	Cost %
Groceries	1											
Milk & Cream	0.70	1										
Vegetables exotic	0.14	0.15	1									
Fruits imported	0.21	0.35	0.38	1								
Poultry	0.39	0.41	0.27	0.39	1							
Sea Food	0.39	0.38	0.23	0.29	0.78	1						
Meat	0.22	0.48	0.34	0.54	0.60	0.64	1					
Vegetables	0.86	0.76	0.33	0.36	0.42	0.37	0.28	1				
Fruits	0.24	0.22	0.63	0.69	0.63	0.52	0.52	0.42	1			
Ice Cream	0.54	0.45	-0.07	-0.21	0.07	0.00	-0.12	0.53	-0.22	1		
Kitchen Fuel	-0.58	-0.28	0.11	0.17	0.07	0.05	0.22	-0.48	0.15	-0.48	1	
Cost%	0.00	-0.04	0.48	0.19	-0.20	-0.31	-0.09	0.06	0.22	-0.19	0.18	1

From the above table it is evident that milk & cream, poultry, sea food, meat and ice cream issues are negatively associated with the food cost and all other the issues to the kitchen are positively associated.

Table 22: Results of regression analysis for materials issued to kitchen for the month November and the cost percentage:

Groceries	Coefficients	P-Value
Milk & Cream	2.975	0.12
Milk & Cream	1.86E-07	0.09
Vegetables exotic	4.44E-05	0.88
Fruits imported	0.0013	0.04
Poultry	3.34E-05	0.85
Sea Food	9.36E-05	0.66
Meat	5.01E-05	0.06
93Vegetables	1.44E-05	0.61
Fruits	1.08E-05	0.76
Ice Cream	3.59E-05	0.62
Kitchen Fuel	3.75E-05	0.31

From the above table it is evident that groceries have more weightage against the food cost %.It is also evident that p value is < 0.05 for fruits imported and hence indicates strong evidence against null hypothesis. Hence the null hypothesis is rejected. Since p value > 0.05 for groceries, milk & cream, vegetables exotic, sea food, vegetables, poultry, meat, fruits, ice creams and kitchen fuel, null hypothesis is accepted.

Table 23: Correlation for materials issued to kitchen for the month December and the cost percentage

From the above table it is evident that groceries, milk & cream, fruits imported, poultry, sea food, meat, fruits and ice cream issues are negatively associated with the food cost and all other the issues to the kitchen are positively associated.

	Groce-ries	Milk & Cream	Vegetables exotic	Fruits imported	Poultry	Sea Food	Meat	Vegetables	Fruits	Ice Cream	Kitchen Fuel	Cost %
Groceries	1											
Milk & Cream	0.69	1										
Vegetables exotic	0.44	0.39	1									
Fruits imported	0.56	0.41	0.52	1								
Poultry	0.77	0.90	0.42	0.53	1							
Sea Food	0.81	0.76	0.24	0.31	0.86	1						
Meat	0.64	0.68	0.31	0.40	0.69	0.66	1					
Vegetables	0.50	0.48	0.57	0.50	0.41	0.27	0.43	1				
Fruits	0.39	0.53	0.32	0.56	0.46	0.23	0.55	0.67	1			
Ice Cream	-0.18	-0.05	0.02	-0.34	-0.10	-0.08	-0.03	-0.27	-0.17	1		
Kitchen Fuel	-0.00	0.00	-0.00	-0.21	-0.05	0.06	-0.00	-0.09	-0.20	0.11	1	
Cost%	-0.11	-0.32	0.27	-0.04	-0.43	-0.36	-0.48	0.24	-0.13	-0.03	0.09	1

Table 24: Results of regression analysis for materials issued to kitchen for the month December and the cost percentage:

Groceries	Coefficients	P-Value
Milk & Cream	0.212	0.90
Milk & Cream	1.04E-05	0.32
Vegetables exotic	5.26E-05	0.18
Fruits imported	0.0013	0.06
Poultry	8.03E-05	0.59
Sea Food	0.0001	0.008
Meat	3.43E-06	0.30
93Vegetables	8.92E-05	0.004
Fruits	4.22E-06	0.07
Ice Cream	1.29E-05	0.79
Kitchen Fuel	9.68E-06	0.73

From the above table it is evident that groceries have more weightage against the food cost %.It is also evident that p value is < 0.05 for sea food and vegetables and hence indicates strong evidence against null hypothesis. Hence the null hypothesis is rejected. Since p value > 0.05 for groceries, milk & cream, vegetables exotic, fruits imported, poultry, meat, fruits, ice creams and kitchen fuel, null hypothesis is accepted.

Thusthe correlation analysis indicates the following.

Table 25: Positively and negatively correlated materials for 12 months from January -December, 2015

Months	Positively Correlated	Negatively Correlated
Jan. 2015	Groceries, milk & cream, vegetables exotic, fruits imported, poultry, meat, vegetables, fruits,	Seafood, ice cream and kitchen fuel
Feb. 2015	Groceries, fruits imported, vegetables, fruits, ice cream	Milk & cream, vegetables exotic, poultry, seafood, meat and kitchen fuel
Mar. 2015	Groceries, vegetables exotic, fruits imported, vegetables, fruits, ice cream	Milk & cream, poultry, seafood, meat and kitchen fuel
Apr. 2015	Groceries, milk & cream, vegetables exotic, fruits imported, poultry, sea food, meat, vegetables, fruits, ice cream, kitchen fuel	-
May. 2015	Groceries, milk & cream, vegetables exotic, fruits imported, vegetables, fruits, ice cream, kitchen fuel	Poultry, seafood and meat issues
June 2015	Vegetables exotic, fruits imported, poultry, sea food, meat, fruits, kitchen fuel	Groceries, milk & cream, poultry, sea food, vegetables and ice cream
July 2015	Groceries, vegetables exotic, fruits imported, vegetables, fruits, kitchen fuel	Milk & cream, poultry, sea food, meat, ice cream and kitchen fuel
Aug. 2015	Groceries, milk & cream, vegetables exotic, fruits imported, sea food, meat, vegetables, fruits	Poultry, ice cream and kitchen fuel
Sept. 2015	Groceries, vegetables exotic, fruits imported, vegetables, fruits, kitchen fuel	Milk & cream, poultry, sea food, meat and ice cream issues
Oct. 2015	Groceries, milk & cream, vegetables exotic, fruits imported, vegetables, fruits, ice cream, kitchen fuel	Poultry, sea food and meat issues
Nov. 2015	Groceries, vegetables exotic, fruits imported, vegetables, fruits, kitchen fuel	Milk & cream, poultry, sea food, meat and ice cream
Dec. 2015	Vegetables exotic, vegetables, kitchen fuel	Groceries, milk & cream, fruits imported, poultry, sea food, meat, fruits and ice cream

Table 25 points out that groceries is found to have significant relationship and more weightage on food cost % for all the 12 months from Jan.2015 - Dec. 2015.

Suggestions:

1. Based on the finding of food cost, it is observed that food cost % in the month of Jan. 2015 is found to be 119.24%. Hence the management should ensure that food is not being wasted or more portion of food per plate is not supplied.

2. In the month of May, the hotel is found to be operating with low food cost % (15.13%). Though this accounts to higher revenues, the management should confirm that food is not being served with lesser portion per plate or with sub-standard quality of food as it may result in loss of permanent customers.

3. Food cost % increases with the increase in positively correlated materials. Hence the management should see to it that such materials are carefully handled without wastages.

4. Weightage of groceries on food cost % is found to be high when compared to other materials. Hence groceries must be issued and cooked with utmost care.

Conclusion:

The high food cost % of 119.24 in the month **of January** negatively contributes to the profit. The low food cost% in the month of May at 15.13% implies that the food is not *being served with lesser p*ortion per plate or with sub-standard quality of food, Among all the materials issued to kitchen, groceries h*as major impact on food cost % as the weightage* of groce**ries is found to be mor**e in all the months. This study paves way for owners in hotel business to adopt suitable technique to take care of food cost in ensuring high profits.

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