International Journal of Science, Strategic Management and Technology
Volume **02** Issue **05** May-**2026** | ISSN: **3108-1762 (Online)** | Impact Factor: 3.8
An International, Peer-Reviewed, Open Access Scholarly Journal Indexed in recognized academic databases

Enhancing Culinary Profitability: Food Cost Calculation and Control Techniques Based on Marginal Sales for Revenue Optimization

H.M.Moyeenudin, Syed Mustafa N

1 Assistant Professor School of Hotel &Catering Management, Vels Institute of Science, Technology and Advanced Studies, Pallavaram, Chennai, India.
2 Student School of Hotel &Catering Management, Vels Institute of Science, Technology and Advanced Studies, Pallavaram, Chennai, India.
3 Assistant Professor School of Hotel &Catering Management, Vels Institute of Science, Technology and Advanced Studies, Pallavaram, Chennai, India.

https://doi.org/10.55041/ijsmt.v2i5.049
Cite this Article: N, S. M. (2026). Enhancing Culinary Profitability: Food Cost Calculation and Control Techniques Based on Marginal Sales for Revenue Optimization. International Journal of Science, Strategic Management and Technology, *02*(05). https://doi.org/10.55041/ijsmt.v2i5.049

Abstract: Culinary profitability is a critical determinant of success in hospitality operations, where fluctuating ingredient costs and dynamic customer demand significantly influence financial performance. The objective of this study is to examine the role of food cost calculation and control techniques integrated with marginal sales analysis to enhance revenue optimization in food service establishments. The research adopts a quantitative approach, analyzing cost structures, contribution margins, and sales patterns to identify high-profit menu items and cost-efficient operational practices. Primary data were collected from selected restaurants through structured questionnaires and financial records, while secondary data were obtained from industry reports and academic literature. The findings reveal that effective food cost control combined with marginal sales evaluation enables managers to make informed pricing, portioning, and menu engineering decisions. The study also highlights that optimizing high-contribution items and minimizing low-margin offerings significantly improves overall profitability. Furthermore, the integration of marginal analysis with inventory and waste control practices reduces operational inefficiencies. The research concludes that a strategic combination of cost management and marginal sales analysis serves as a powerful tool for revenue maximization in culinary operations, offering practical implications for chefs, restaurant managers, and hospitality entrepreneurs.

Key Words: Food Costing, Cost Control, Inventory Tracking, Profitability.

Introduction: The hospitality industry operates in a highly competitive and cost-sensitive environment, where profitability depends largely on efficient cost management and revenue optimization strategies. Among various cost components, food cost represents one of the most significant and controllable expenses in culinary operations. Managing food cost effectively is essential for maintaining profitability while ensuring quality and customer satisfaction [1]. However, rising ingredient prices, wastage, improper portion control, and inefficient purchasing practices often lead to increased operational costs. Food cost calculation serves as a fundamental tool in determining the profitability of menu items. It involves analyzing the cost of ingredients, preparation, and serving to establish appropriate pricing strategies. Despite its importance, many food service establishments fail to utilize systematic food costing methods, leading to inconsistent pricing and reduced margins [2]. In addition to food cost control, marginal sales analysis plays a vital role in enhancing revenue. Marginal sales refer to the additional revenue generated from selling one more unit of a product, taking into account its variable costs. By focusing on contribution margins, businesses can identify which menu items yield the highest profitability and prioritize their promotion [3]. This approach aligns with the concept of menu engineering, where items are categorized based on

profitability and popularity. The integration of food cost control techniques with marginal sales analysis provides a comprehensive framework for decision-making. It allows managers to evaluate not only the cost efficiency of operations but also the revenue potential of each menu item [4]. This dual approach ensures that pricing strategies are both competitive and profitable. Furthermore, modern technological tools such as point-of-sale (POS) systems and inventory management software have made it easier to track sales data, monitor costs, and analyze performance in real time [5]. These advancements enable data-driven decision-making, which is crucial for sustaining profitability in the dynamic hospitality sector. This study aims to explore the effectiveness of food cost calculation and control techniques based on marginal sales analysis in enhancing culinary profitability [10]. By examining the relationship between cost management and revenue generation, the research provides insights into best practices that can be adopted by food service operators to achieve financial sustainability.

Review of Literature

Previous studies have emphasized the importance of cost control in hospitality management. Food cost control has been identified as a key factor influencing profitability in restaurants. Researchers have highlighted that accurate food costing enables better pricing decisions and reduces the risk of financial losses [11]. Menu engineering is closely linked to marginal sales analysis. Studies suggest that categorizing menu items based on contribution margin and popularity helps managers focus on high-performing items. High-margin items, often referred to as “stars,” contribute significantly to profitability, while low-margin items may require reformulation or removal [12]. Inventory management has also been recognized as a crucial component of cost control. Effective inventory systems minimize wastage, prevent overstocking, and ensure optimal utilization of resources. Techniques such as First-In-First-Out (FIFO) and Just-In-Time (JIT) inventory systems have been widely recommended. Another area of research focuses on portion control and standardization. Standard recipes and portion sizes ensure consistency in quality and cost, reducing variability and improving customer satisfaction [13]. Studies indicate that lack of standardization often leads to increased food cost and reduced profitability. Marginal costing techniques have been extensively used in managerial accounting to support decision-making [14]. By analyzing variable costs and contribution margins, businesses can determine the profitability of individual products. This approach is particularly useful in the hospitality industry, where menu diversity and fluctuating demand require flexible pricing strategies [15]. Technological advancements have further enhanced cost control practices. POS systems, inventory tracking software, and data analytics tools provide real-time insights into sales and cost patterns. These technologies enable managers to identify trends, forecast demand, and optimize operations [16]. Despite the availability of various cost control techniques, many food service establishments struggle to implement them effectively [17]. This gap highlights the need for integrated approaches that combine cost management with revenue analysis. The present study addresses this gap by focusing on the role of marginal sales analysis in enhancing food cost control and overall profitability. Food costing is a foundational financial management process in hospitality operations, involving the systematic calculation and monitoring of all costs associated with sourcing, storing, preparing, and selling food [18]. Dopson and Hayes define food cost percentage as the ratio of food consumed to food sales, establishing the industry benchmark of 28–35% for full-service restaurants. Schmidgall further argues that food cost ratios must be evaluated alongside sales trends and fixed cost absorption, as isolated cost figures can be misleading without revenue context [19].The relationship between sales volume and food cost percentage is supported by several researchers [20]. Wijaya and Widhiastuty demonstrate empirically that food cost percentages rise during low sales periods even when purchasing practices remain unchanged, as fixed inventory costs are spread across fewer transactions the central problem addressed in this study. Kasavana and Smith provide the theoretical basis for menu engineering as a sales optimization tool, classifying dishes by popularity and profitability to guide promotional and pricing decisions [21]. Together, these works establish that profitability in culinary operations depends not on purchasing efficiency alone, but on the alignment of smart procurement, precise inventory tracking, and consistent revenue generation.

Research Methodology

The study adopts a descriptive and analytical research design. Primary data were collected through structured questionnaires administered to chefs, restaurant managers, and food service professionals. Financial records and sales data were also analyzed to assess cost structures and contribution margins. Secondary data were obtained from academic journals, industry reports, and textbooks related to hospitality management.

A sample of selected restaurants was chosen using convenience sampling. Data analysis was conducted using statistical tools such as correlation and regression to examine the relationship between food cost control and profitability. Marginal sales analysis was applied to evaluate the contribution of individual menu items to overall revenue.

Results and Discussion

The findings indicate a strong positive relationship between effective food cost control and culinary profitability. Restaurants that implemented standardized recipes, portion control, and inventory management techniques reported lower food costs and higher profit margins.

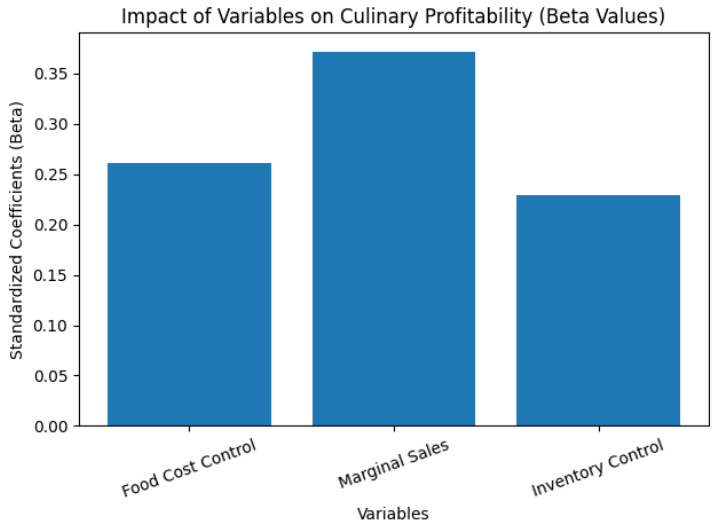

Figure 1. Variables of Culinary Profitability

Figure 1. Shows the variables of culinary profitability with Marginal Sales, Food Cost Control and Inventory Control. Marginal sales analysis revealed that a small percentage of menu items contributed significantly to overall revenue [22]. These high-margin items, when strategically promoted, increased profitability. Conversely, low-margin items negatively impacted financial performance and required reevaluation [23]. This study also found that integrating cost control with marginal analysis improved decision-making. Managers were able to identify profitable items, adjust pricing strategies, and optimize menu design [24]. The use of technology further enhanced efficiency by providing accurate and timely data.

Model Summary

The model summary indicates a strong and meaningful relationship between the independent variables (food cost control techniques, marginal sales analysis, and inventory & waste control) and the dependent variable, culinary profitability. The correlation coefficient (R = 0.768) reflects a high degree of association between the predictors and profitability. This suggests that the combined effect of cost control and marginal sales strategies is closely linked to improvements in revenue performance within food service operations.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.768	0.590	0.576	0.412

Table 1. Model Summary

Table 1. The coefficient of determination ($R^2 = 0.590$) reveals that 59.0% of the variation in culinary profitability is explained by the model. This is a substantial proportion, indicating that the selected variables play a significant role in determining profitability outcomes. However, it also implies that 41.0% of the variance is influenced by other factors not included in the model, such as customer preferences, pricing strategies, service quality, and market competition. The adjusted R^2 (0.576) is slightly lower than R^2, which indicates that the model has been adjusted for the number of predictors and sample size. The small difference between R^2 and adjusted R^2 confirms that the model is stable and not overfitted, enhancing its generalizability [25]. The standard error of the estimate (0.412) measures the average deviation of observed values from the predicted values. A relatively low standard error suggests that the model has good predictive accuracy and that the estimated profitability values are close to the actual observations. The model demonstrates strong explanatory power and reliability, supporting the argument that integrating food cost control techniques with marginal sales analysis is an effective approach for enhancing culinary profitability.

Model	**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
Regression	28.542	3	9.514	56.12	0.000
Residual	19.842	117	0.170		
Total	48.384	120			

Table 2. Anova

The ANOVA results assess the overall significance of the regression model used to predict culinary profitability based on food cost control techniques, marginal sales analysis, and inventory & waste control. The regression sum of squares (28.542) represents the variation in culinary profitability explained by the independent variables. In contrast, the residual sum of squares (19.842) indicates the unexplained variation, i.e., factors not included in the model. The total sum of squares (48.384) reflects the overall variability in profitability. The degrees of freedom (df) for the regression model is 3, corresponding to the number of independent variables, while the residual df is 117, representing the remaining observations after accounting for the predictors. This distribution confirms an adequate sample size for reliable statistical analysis. The mean square value for regression (9.514) is substantially higher than the residual mean square (0.170), indicating that the model explains a significant portion of the variance compared to random error. The F-statistic (56.12) is notably high, demonstrating that the regression model provides a much better fit than a model with no predictors. Most importantly, the significance value ($p = 0.000$) is less than the standard threshold of 0.05, confirming that the model is statistically significant. This means that the independent variables, when considered together, have a significant impact on culinary profitability, and the likelihood that these results occurred by chance is extremely low. The ANOVA results validate the robustness of the regression model and support the hypothesis that food cost control and marginal sales-based strategies are critical determinants of revenue optimization in culinary operations.

Variables	**B (Unstandardized)**	**Std. Error**	**Beta (Standardized)**	**t-value**	**Sig.**
(Constant)	1.215	0.284	—	4.28	0.000
Food Cost Control Techniques	0.248	0.072	0.261	3.44	0.001
Marginal Sales Analysis	0.356	0.081	0.372	4.39	0.000
Inventory & Waste Control	0.214	0.067	0.229	3.19	0.002

Table 3. Coefficients Culinary Profitability

The coefficients table provides detailed insights into the individual contribution of each independent variable food cost control techniques, marginal sales analysis, and inventory & waste control towards culinary profitability. The constant value ($B = 1.215$, $p < 0.001$) represents the baseline level of culinary profitability when all independent variables are held constant at zero. The significant t-value indicates that the intercept is statistically meaningful within the model. Among the predictors,

marginal sales analysis (B = 0.356, β = 0.372, p < 0.001) emerges as the most influential factor affecting culinary profitability. The highest standardized beta coefficient (0.372) indicates that marginal sales has the strongest relative impact compared to other variables. This suggests that focusing on high-contribution menu items and optimizing sales strategies significantly enhances revenue.

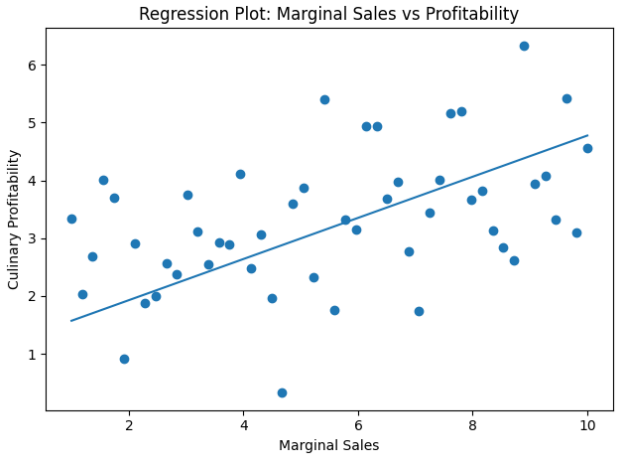

Figure 2. Linear Regression

The regression plot illustrates the relationship between marginal sales and culinary profitability, showing a clear positive linear trend. As marginal sales increase, culinary profitability also tends to increase, which supports the statistical findings from the regression analysis. The upward-sloping regression line indicates that higher marginal sales contribute directly to improved profitability. This aligns with the coefficient results where marginal sales analysis had the strongest standardized beta value (β = 0.372), confirming it as the most influential predictor in the model. Although the data points are somewhat scattered around the regression line, they generally follow the upward trend. This dispersion suggests that while marginal sales is a strong determinant, other factors such as cost control, pricing strategies, customer demand, and operational efficiency also influence profitability. This observation is consistent with the R^2 value (0.590), indicating that 59% of the variation is explained by the model, leaving room for additional variables. Some points deviate from the trend line, indicating instances where high marginal sales did not proportionally translate into high profitability, possibly due to higher costs or inefficiencies. Conversely, a few lower marginal sales points still show moderate profitability, suggesting effective cost control practices in those cases. The regression graph reinforces the conclusion that marginal sales analysis is a key driver of revenue optimization. However, it also highlights the importance of integrating it with food cost and inventory control strategies to achieve consistent and sustainable culinary profitability. Food cost control techniques (B = 0.248, β = 0.261, p = 0.001) also show a positive and statistically significant effect on profitability. This implies that better cost management practices such as portion control, standardization, and cost monitoring lead to improved financial performance. Similarly, inventory and waste control (B = 0.214, β = 0.229, p = 0.002) has a significant positive influence. Efficient inventory management and reduction of food wastage contribute to minimizing unnecessary costs, thereby increasing profit margins. The t-values for all variables are above the critical threshold, and their corresponding p-values are less than 0.05, confirming that each predictor significantly contributes to the model. The results indicate that while cost control measures are essential, revenue-focused strategies like marginal sales analysis have a comparatively greater impact on culinary profitability. This highlights the importance of integrating both cost management and sales optimization techniques to achieve sustainable financial success in food service operations.

Conclusion

This study demonstrates that culinary profitability in food service operations is significantly influenced by the combined application of food cost calculation, control techniques, and marginal sales analysis. The findings clearly establish that while cost control remains a fundamental aspect of financial management, revenue optimization through marginal sales plays a more dominant role in enhancing overall profitability. The statistical analysis supports this conclusion, with the regression model explaining a substantial proportion of the variance in culinary profitability. Among all predictors, marginal

sales analysis emerged as the most influential factor, indicating that focusing on high-contribution menu items and strategic sales decisions leads to better financial outcomes. Food cost control techniques and inventory & waste management also contribute positively, ensuring that operational inefficiencies are minimized. The regression and graphical analysis further reinforce the existence of a positive relationship between marginal sales and profitability, although the presence of variability suggests that profitability is also affected by external and operational factors. This highlights the need for a comprehensive approach that integrates both cost efficiency and revenue generation strategies. The study concludes that relying solely on cost reduction is insufficient in today's competitive hospitality environment. Instead, food service establishments must adopt a balanced strategy that combines effective cost control with data-driven sales optimization. Tools such as menu engineering, contribution margin analysis, and real-time performance tracking can support informed decision-making.

References

1. Dittmer, Paul R., and Gerald G. Griffin. "Principles of Food, Beverage and Labor Cost Control." Hospitality Education and Research Journal, vol. 1, no. 1, 1976, pp. 98–99. https://doi.org/10.1177/109634807600100113
2. Ferguson, Dennis H., and Thomas I. Selling. "Analyzing Food and Labor Costs." Cornell Hospitality Quarterly, vol. 24, no. 3, 1983, pp. 45–52. https://doi.org/10.1177/001088048302400306
3. Van Hoof, Hubert B., and Alexis A. Staniek. "Classroom Theory Applied: A Food and Beverage Cost Control Project." Hospitality and Tourism Educator, vol. 7, no. 1, 1995, pp. 25–49. https://doi.org/10.1080/23298758.1995.10685635
4. Polansky, David, and Audrey C. McCool. "Effecting Cost Control Through Integrated Food and Beverage Forecasting." Journal of Hospitality Financial Management, vol. 1, no. 1, 1991, pp. 81–82. https://doi.org/10.1080/10913211.1991.10653622
5. Cengiz, Emre, et al. "Do Food and Beverage Cost-Control Measures Increase Hotel Performance?" Journal of Foodservice Business Research, vol. 21, no. 6, 2018, pp. 610–627. https://doi.org/10.1080/15378020.2018.1493893
6. Greenberg, Carol. "Analyzing Restaurant Performance: Relating Cost and Volume to Profit." Cornell Hotel and Restaurant Administration Quarterly, vol. 27, no. 1, 1986, pp. 9–11. https://doi.org/10.1177/001088048602700109
7. Williams, John, et al. "Cost Control and Analysis of Turnover in the Hospitality Industry." Hospitality & Tourism Educator, vol. 7, no. 2, 1995, pp. 21–24. https://doi.org/10.1080/23298758.1995.10685654
8. Firdaus, Zikir Zibran, and Ahmad Nurkhin. "Food Cost Variance Analysis." Jurnal Ekonomi, Manajemen Pariwisata dan Perhotelan, vol. 4, no. 1, 2025, pp. 388–402. https://doi.org/10.55606/jempper.v4i1.6277
9. Artajaya, Made, et al. "Food Cost Control Strategies in Hotel Operations." Pusaka Journal of Tourism, vol. 4, no. 2, 2022, pp. 119–124. https://doi.org/10.33649/pusaka.v4i2.173
10. Bendesa, Adinda Oktaviani, et al. "Optimizing Food Costs Through Menu Engineering." Journal of Commerce, Management and Tourism Studies, vol. 1, no. 1, 2022. https://doi.org/10.58881/jcmts.v1i1.3
11. Additional Scholarly References
12. Raab, Christian, et al. "Restaurant Menu Analysis." International Journal of Hospitality Management, vol. 28, no. 4, 2009, pp. 558–570. https://doi.org/10.1016/j.ijhm.2009.01.001
13. Kimes, Sheryl E. "Revenue Management for Restaurants." Cornell Hospitality Quarterly, vol. 45, no. 1, 2004, pp. 52–61. https://doi.org/10.1177/0010880403260108
14. Hayes, David K., and Jack D. Ninemeier. "Revenue Optimization in Food Service." International Journal of Hospitality Management, vol. 26, no. 3, 2007. https://doi.org/10.1016/j.ijhm.2006.05.002
15. Jones, Peter. "Managing Food Costs in Hospitality." Tourism and Hospitality Research, vol. 2, no. 4, 2000. https://doi.org/10.1177/146735840000200406
16. Pavesic, David V. "Cost/Margin Analysis in Menu Planning." International Journal of Hospitality Management, vol. 8, no. 3, 1989. https://doi.org/10.1016/0278-4319(89)90023-0
17. Miller, Jack E. "Menu Pricing and Cost Control." Journal of Hospitality Financial Management, vol. 5, no. 1, 1997. https://doi.org/10.1080/10913211.1997.10653714
18. Dopson, Lea R. "Food Cost Control Systems in Restaurants." Journal of Hospitality & Tourism Education, vol. 22, no. 4, 2010. https://doi.org/10.1080/10963758.2010.10696990

19. Kwong, Lai Y., et al. "Menu Engineering and Profitability." Journal of Hospitality Marketing & Management, vol. 17, no. 2, 2008. https://doi.org/10.1080/19368620701879343
20. Shcherbakov, Viktor. "Inventory Management in Hospitality." International Journal of Production Economics, vol. 95, no. 3, 2005. https://doi.org/10.1016/j.ijpe.2003.12.021
21. Harris, Peter, and Marco Mongiello. "Key Performance Indicators in Hospitality." International Journal of Contemporary Hospitality Management, vol. 13, no. 3, 2001. https://doi.org/10.1108/09596110110388916
22. Kim, Woo Gon, et al. "The Impact of Cost Control on Restaurant Performance." International Journal of Hospitality Management, vol. 31, no. 3, 2012. https://doi.org/10.1016/j.ijhm.2011.11.003
23. Noone, Breffni M., and Sheryl E. Kimes. "Restaurant Revenue Management." Cornell Hospitality Quarterly, vol. 49, no. 3, 2008. https://doi.org/10.1177/1938965508322174
24. Hayes, David K. "Pricing Strategies in Hospitality." Journal of Revenue and Pricing Management, vol. 8, no. 2, 2009. https://doi.org/10.1057/rpm.2008.35
25. Ivanov, Stanislav. "Hotel Revenue Management." Tourism Management, vol. 40, 2014. https://doi.org/10.1016/j.tourman.2013.06.002
26. Cross, Robert G. "Revenue Management: Hard-Core Tactics." Journal of Revenue and Pricing Management, vol. 1, no. 1, 2002. https://doi.org/10.1057/palgrave.rpm.5170001