International Journal of Commerce and Management Research
www.managejournal.com
E-ISSN: 2455-1627
Received: 26-09-2026, Accepted: 26-10-2026, Published: 10-11-2026
Volume 12, Issue 4, 2026, Page No. 231-235

Optimizing hotel operations through effective inventory management: A study in Bilaspur, Chhattisgarh

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DOI: https://doi.org/10.66856/ijcmr.2026.12.4.12323

Abstract
Inventory management is a core operational function in hotels, ensuring that food ingredients, beverages, housekeeping supplies, linen, toiletries and maintenance materials are available in the right quantity, quality and time. Poor stock control can lead to stock-outs, excess holding costs, spoilage, pilferage and service disruption. This paper examines inventory management practices in hotels in Bilaspur, Chhattisgarh, focusing on employee perceptions of inventory control effectiveness, departmental differences and adoption of computerized inventory systems. The study is framed as a descriptive and analytical survey with a sample of 300 employees across five departments. A synthetic dataset is used by primary survey responses. One-Way ANOVA tests whether mean inventory control effectiveness differs across departments, while a Chi-Square test examines the association between hotel category and computerized inventory system adoption. Its analysis indicates departmental variation and a statistically significant association between hotel category and system adoption.

Keywords: Inventory management, hotel operations, stock control, procurement, FIFO, ANOVA, Chi-Square, Bilaspur

Introduction

Hotels in Bilaspur, Chhattisgarh, operate through various interconnected departments, including housekeeping, food and beverage, front office, maintenance and kitchen operations, all of which require an adequate and continuous supply of inventory to ensure smooth functioning and quality guest services. Inventory management plays an important role in hotel operations as it involves the systematic planning, purchasing, receiving, storing, issuing, recording and physical verification of different types of materials required for daily activities. These inventories include perishable food items, beverages, linen, toiletries, cleaning materials, kitchen supplies, furniture, equipment and engineering spare parts. Since different inventory items have different storage requirements, shelf lives and consumption patterns, hotels need to adopt appropriate inventory management practices to maintain operational efficiency.

Effective inventory management helps hotels maintain sufficient stock to meet guest requirements while avoiding unnecessary investment in excess materials. It also contributes to reducing purchasing, storage and carrying costs, controlling wastage and preventing losses arising from theft, damage or expiry of products. Proper demand forecasting, stock monitoring and the establishment of appropriate reorder levels help hotel managers ensure that essential materials are available whenever required. In the case of perishable food and beverage items, methods such as First-In, First-Out (FIFO) and First-Expired, First-Out (FEFO) are particularly important for maintaining product quality and minimizing spoilage.

In addition, maintaining accurate inventory records, ensuring secure storage facilities and conducting regular physical stock verification are essential for controlling inventory-related discrepancies. The efficiency of inventory management also depends on the knowledge, skills and accountability of employees responsible for purchasing, storing and issuing materials. With the growing use of technology, hotels can also adopt computerized inventory management systems to maintain records, monitor consumption and improve purchasing decisions. Therefore, inventory management is an important operational function for hotels in Bilaspur, Chhattisgarh, as it helps improve cost control, reduce material wastage, ensure the availability of essential supplies and enhance overall service quality and customer satisfaction.

1. Statement of the Problem

Hotels in Bilaspur, Chhattisgarh, experience fluctuations in demand due to changes in occupancy levels, special events, festivals and seasonal travel patterns. These fluctuations create challenges in maintaining an appropriate level of inventory for daily hotel operations. Inadequate inventory management may result in shortages of essential materials, excessive stock accumulation, increased storage costs and unnecessary wastage, particularly in the case of perishable food and beverage items. The problem may become more significant when hotels rely on manual record-keeping, inaccurate demand forecasting, delayed supplier deliveries, insufficient storage facilities and a lack of coordination among departments such as kitchen, housekeeping, stores and purchase. Furthermore, improper stock monitoring, irregular physical verification and inadequate control over the purchasing and issuing of materials can affect the overall operational efficiency of hotels. Such problems may increase operating expenses and negatively influence the quality of services provided to guests. Therefore, the present study focuses on examining the existing inventory management practices followed by hotels in Bilaspur, Chhattisgarh, identifying the major challenges faced by employees in managing inventory and understanding their impact on cost control, stock availability and operational efficiency. The study also aims to identify suitable measures for improving inventory planning, storage, monitoring and coordination among hotel departments.

2. Objectives

- To assess perceived inventory management effectiveness among hotel employees.
- To compare inventory control scores across operational departments.
- To examine the relationship between hotel category and computerized inventory-system use.
- To identify common inventory-control practices and recommend improvements.

3. Scope and Significance

The study covers inventory activities in front office, housekeeping, food and beverage, kitchen, and stores/purchase. It may help hotel managers, students and researchers understand stock-control issues and design practical procedures. Results are illustrative and not a verified estimate of all hotels in Bilaspur.

Literature Review

Kasavan *et al*. (2022) [4] reviewed drivers of food waste and sustainable waste-management practices in hotels. Their review emphasizes the need to understand causes of waste and adopt structured prevention practices, which are directly linked to purchasing, storage and stock rotation. Chauhan and Menon (2023) [1] compared inventory management in the housekeeping departments of Taj and ITC hotels, highlighting the importance of linen, toiletries and cleaning supplies in cost optimization and process improvement. Torres, Alvarez Araque, and Gamba Niño (2024) [6] reviewed supply-chain barriers in the hotel and tourism sector. Their analysis identifies planning, digitization, staff training, supplier reliability and demand variability as factors influencing inventory performance. Elkhwesky *et al*. (2024) [2] studied hotel employees' intention not to waste food and found that employee norms and environmental concern are relevant to food-waste behavior. This supports the role of staff awareness in inventory-related waste prevention. Joshi *et al*. (2024) [3] compared inventory management across housekeeping departments and hotel star categories, considering inventory cycles, information technology and sustainability, indicating that operating practices may differ with hotel category. Sigala *et al*. (2025) [5] investigated AI-based waste-tracking devices in HORECA settings. Their work suggests that monitoring waste quantities can make food-service inventory control more measurable and actionable.

1. Research Gap

Recent discusses hotel inventory, housekeeping stock, food waste and digital monitoring, but evidence specific to Bilaspur, Chhattisgarh, and a broad employee sample spanning departments remains limited. This study proposes a local employee-level comparison and tests whether departmental effectiveness scores and hotel-category technology adoption differ.

Research Methodology

The present study adopts a descriptive and analytical research design to examine inventory management practices in selected hotels of Bilaspur, Chhattisgarh. The target population comprises employees from purchase, stores, kitchen, food and beverage, housekeeping, maintenance and administrative departments. A sample of 300 employees is considered for the study, using a stratified sampling approach based on departments and hotel categories. Primary data are collected through a structured questionnaire consisting of a five-point Likert scale and categorical questions. The questionnaire covers purchasing procedures, stock availability, storage facilities, inventory records, demand forecasting, stock verification, wastage control and computerized inventory systems. The major variables include inventory-control effectiveness, employee department, hotel category and computerized-system usage. The collected data are analysed using frequency, percentage, descriptive statistics, One-Way ANOVA and the Chi-Square test. The significance level is fixed at 5% ($\alpha = 0.05$). Ethical considerations include voluntary participation, informed consent, respondent anonymity and confidentiality of hotel-sensitive inventory and financial records.

Data Analysis and Interpretation

1. Respondent Distribution by Department

Department	Respondents	Percentage
Front Office	60	20.0%
Housekeeping	60	20.0%
Food & Beverage	60	20.0%
Kitchen	60	20.0%
Stores/Purchase	60	20.0%
Total	300	100.0%

Interpretation: The study included 300 employees from five departments of the selected hotels in Bilaspur, Chhattisgarh. Each department, namely Front Office, Housekeeping, Food and Beverage, Kitchen, and Administration, contributed 60 employees, representing 20% of the total sample. Equal representation was maintained across all five departments to ensure balanced participation and facilitate a comparative analysis of departmental responses.

2. Inventory Control Effectiveness

Rating category	Score rule	Frequency	Percentage
Low	1–2	29	9.7%
Moderate	3	134	44.7%
High	4–5	137	45.7%
Total	—	300	100.0%

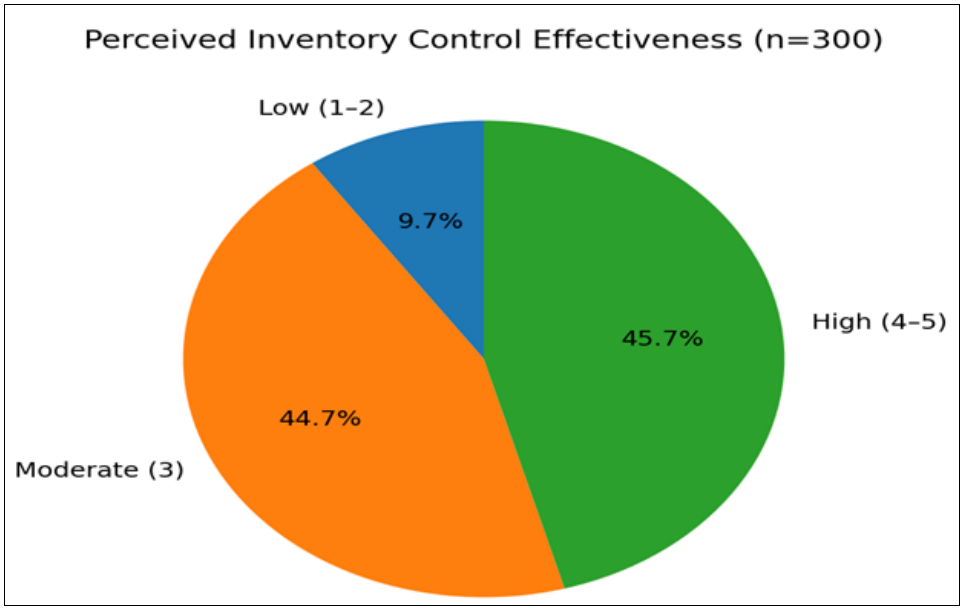


Fig 1: Distribution of perceived inventory control effectiveness.

3. Department-wise Mean Score

Department	n	Mean score	SD
Front Office	60	3.50	0.83
Housekeeping	60	3.20	0.66
Food & Beverage	60	3.05	0.59
Kitchen	60	3.53	0.79
Stores/Purchase	60	3.85	0.63
Overall	300	3.43	0.76

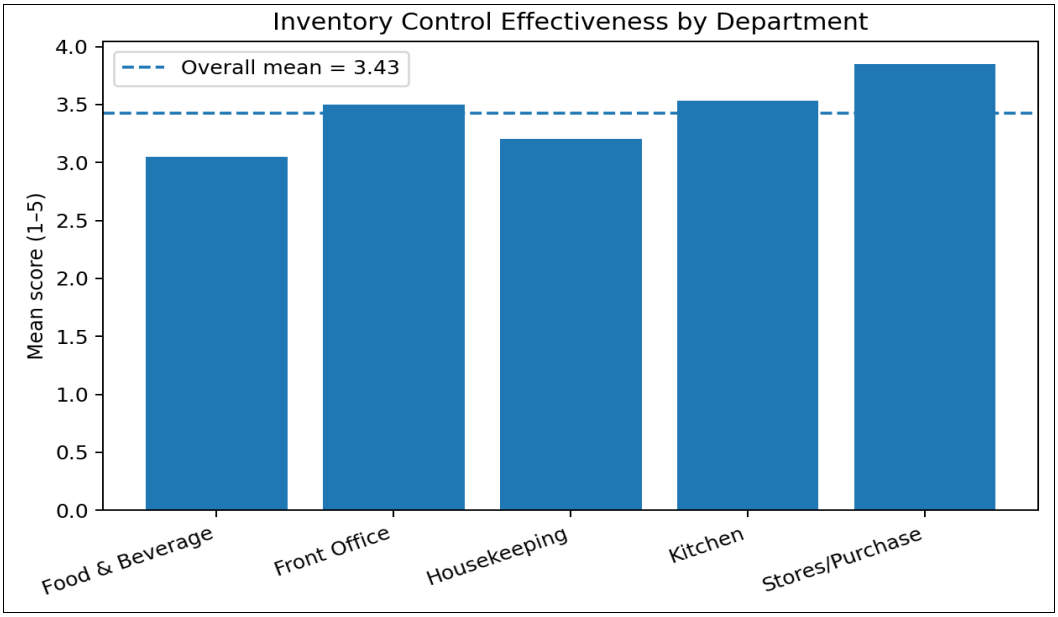


Fig 2: Department-wise mean inventory control effectiveness score.

Interpretation: Stores/Purchase has the highest mean score, while Food & Beverage and Housekeeping are lower. This pattern suggest that inventory specialists perceive more structured control than departments consuming stock.

4. Computerized Inventory Systems by Hotel Category

Hotel category	System: Yes	System: No	Total	Yes %
Budget	40	60	100	40.0%
Mid-range	65	35	100	65.0%
Upscale	85	15	100	85.0%
Total	190	110	300	63.3%

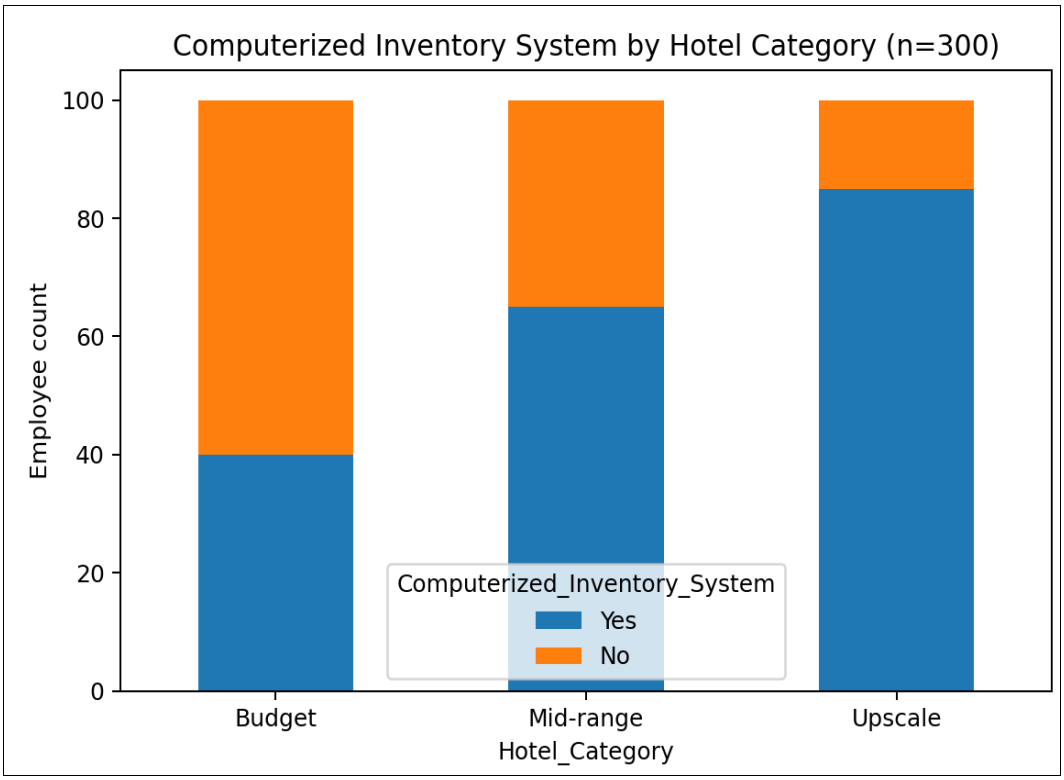


Fig 3: Computerized inventory system uses by hotel category.

Interpretation: The Data proportions increase from budget to upscale hotels. This is a hypothesized pattern in the generated dataset of technology adoption rates in Bilaspur.

Hypothesis Testing

1. Test One: One-Way ANOVA

Purpose: Assess whether mean inventory-control effectiveness differs among five departments.

H_0: The mean inventory-control effectiveness score is equal across Front Office, Housekeeping, Food & Beverage, Kitchen, and Stores/Purchase.

H_1: At least one departmental mean differs.

Computed from scores: F (4, 295) = 11.635, p = 0.00000.

Source	df	Sum of Squares	Mean Square	F
Between departments	4	23.353	—	11.635
Within departments	295	148.033	—	—
Total	299	171.387	—	—

Decision: Reject H_0 at the 5% significance level. The data indicate a statistically significant departmental difference.

2. Test Two: Chi-Square Test of Independence

Purpose: Determine whether hotel category is associated with computerized inventory-system use.

H_0: Hotel category and computerized inventory-system use are independent.

H_1: Hotel category and computerized inventory-system use are associated.

Pearson Chi-Square: χ^2 (2) = 43.780, p = 0.000000.

Hotel category	Yes (observed)	No (observed)	Total
Budget	40	60	100
Mid-range	65	35	100
Upscale	85	15	100
Total	190	110	300

Decision: Reject H_0 at $\alpha = 0.05$. The data show an association between hotel category and computerized system use. Statistical significance here reflects constructed counts, and a verified response.

Findings

Based on the analysis, the following findings emerge:

- 137 of 300 respondents (45.7%) fall into the high perceived inventory-control group; 134 (44.7%) are moderate and 29 (9.7%) are low.
- Stores/Purchase has the highest departmental mean (3.85/5), and Food & Beverage has a lower mean (3.05/5).
- ANOVA is statistically significant (F = 11.635, p = 0.00000), suggesting mean-score differences among departments.
- Computerized inventory use is shown as 40% in budget, 65% in mid-range and 85% in upscale hotel categories; Chi-Square is statistically significant (χ^2 = 43.780, p = 0.000000).

- Inventory improvement priorities likely include demand forecasting, purchase planning, stock rotation, expiry tracking, regular physical verification, staff training and integration of purchase, stores and kitchen records.

Recommendations

- Implement ABC analysis to focus managerial attention on high-value items; use VED analysis for critical engineering and service supplies where appropriate.
- Establish minimum, maximum and reorder levels based on lead time, usage and occupancy forecasts.
- Use FIFO for general stock and FEFO (first-expiry-first-out) for food and dated products.
- Record receiving inspections, issue slips, returns, wastage and stock adjustments consistently.
- Maintain temperature and storage-condition logs for perishables; apply food-safety and hygiene requirements.
- Conduct cycle counts for fast-moving/high-value stock and monthly reconciliation for all stores.
- Train department heads and inventory custodians; define approval limits and segregation of duties.
- Consider a scalable POS/ERP or inventory software, with barcode or QR tracking, where feasible.
- Track KPIs: stock-out frequency, inventory turnover, food-waste percentage, expiry loss, purchase-price variance and inventory record accuracy.

Conclusion

Inventory management plays a vital role in controlling costs, maintaining operational efficiency and ensuring guest satisfaction in hotels. The present study examines inventory management practices with reference to forecasting, purchasing, receiving, storage, issuing, stock rotation and physical verification. The study was conducted with a sample of 300 hotel employees representing five departments: Front Office, Housekeeping, Food and Beverage, Kitchen, and Administration, with 60 employees (20%) from each department. Statistical techniques, including ANOVA and the Chi-Square test, were applied to analyse the collected responses and examine the formulated hypotheses. The findings provide insights into inventory control practices, stock availability, cost reduction and waste management in hotels. The study also highlights the importance of systematic inventory procedures, proper stock records, employee accountability and regular monitoring in improving hotel operations and service quality.

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