

Inventory Management Systems: A Pathway Towards Improving Housekeeping Operations

Sarika Joshi

Assistant Professor

AISSMS college of Hotel Management & Catering Technology, Pune

&

Dr. Deepa Prasad Venkatraman

Professor

Department of Management Sciences (PUMBA)

SavitribaiPhule Pune University, Ganeshkhind, Pune-411007

Abstract: The paper is organized as follows. The general operations of hotel housekeeping are discussed. This is followed by a review of previous studies in order to identify the factors of housekeeping, types of inventories and different inventory management techniques followed in Housekeeping department. Followed by the various inventory management techniques which are rated by the housekeepers, on their impact on housekeeping operational performance. The research design for these factors further is then explained further. Finally, the impact of these inventory management techniques on the housekeeping operations is tested by using regression analysis as a tool of data interpretation. This is based on access to a data set derived from structured questionnaire asked to the hotel housekeeping staff of star category hotels in Pune region. The findings of the study are discussed and the suggestions are made on how the hotels can improve on their inventory management techniques to benefit the smooth operations of the housekeeping department.

Keywords: Inventory management, Hotel Housekeeping Department

Keyterms and definitions:

Housekeeping: Housekeeping is defined as the provision of a clean, comfortable, safe and aesthetically appealing environment.

Inventory: The term inventory can be described as the stocks of purchased operating supplies, equipment, and other items held for future use in housekeeping operations

Inventory Management: As per Business Dictionary it is the value of materials and goods held by an organization to support production, for support activities, or for sale or customer service.

1. Introduction

The main objective of a Hotel establishment is to provide a clean, comfortable and a welcoming surrounding to their guests. As cleanliness cannot be compromised with any other facility or the service that the hotel provides. Hotel cleanliness and upkeep is extremely essential for guest satisfaction and repeat business. As most of the times, the guests will form an image about the hotels based on this experience. Out of the core departments of the hotel, this responsibility lies with the Hotel Housekeeping Department. Commonly known as the Backbone of the hotel, the cleanliness, upkeep and maintenance of not only the rooms, but also the public areas are the duty of Housekeeping department. Imagine the huge pile of linen and uniforms to be cleaned and the large number of amenities to be placed in a room, Inventory becomes one of the most important function of hotel housekeeping. Hence it is also necessary for the housekeeper to plan for and become organized in stock handling administration. This refers to the selection, purchase, use, and control of material for use in housekeeping operations. The Executive Housekeeper is responsible for two types of inventories, recycled and non-recycled items. Recycled inventories are for items that can be used over and over again in housekeeping operations. These include things like linen, uniforms, Cleaning equipments and guest loan items such as irons, ironing boards, hair dryers, heating pads, hot-water bottles, etc. Non-Recycled inventories includes items that are used up repeatedly during the course of routine housekeeping operations, such as most guest room amenities, cleaning supplies, and smaller cleaning equipment such as brooms, mops, cleaning cloths and so on. To ensure smooth housekeeping operations, the top management of the hotel must establish an operating par stock. A Par stock is a term which is the standard way to determine the minimum level of supplies to meet daily demands of daily hotel operation. Inventory control is the management function of classifying, ordering, receiving, storing, issuing and accounting for stock. The executive housekeeper has to classify these inventories but also should be competent in technical aspects like the selection, use, and maintenance of material items such as linen, uniform, cleaning agents, cleaning equipment, furniture, guest amenities, etc. The room rate is an indicator of the quality of such material which is used by the hotel. Thus, Inventory control enables housekeeping department to provide better services to its customers, by maintaining a smooth flow of Housekeeping supplies for its operations. It also maintains the right amount of stock of material needed for operations at all times. It also helps in checking on pilferages by strict control of stock.

This study aims to study aims to understand what contributes towards the smooth Housekeeping operations. The purpose of this study is to understand the procedure for different types of housekeeping inventories and in particular to assess the impact of inventory control techniques on the functioning of the

departmental operations. The following section discusses the literature review on these aspects to develop the hypotheses. In the methods, a research design involving questionnaire development, data-collection procedure is described. Next, data-analysis and results are presented. Finally, a discussion regarding interpretation of the study's findings, implications for researchers and practitioners, and limitations are presented.

.1.2 Scope of Research

The scope of the research is applicable to the following:

- The scope is applicable to the Hotel Housekeeping department of star category hotels in Pune, India.
- It is applicable to inventory management practices followed in Housekeeping department of Hotels.

1.3 Limitations of the Research

The research is applicable to only one department of the hotel. The research is limited to the Housekeeping department and the inventory management practices applicable to housekeeping department.

2. Literature Review:

- **Abuya, M. B., & Shale, N. I. (2018):** The study was conducted in Kenya and aimed at establishing the role of Inventory management on the performance of the hotel industry. To conduct the study, about 400 supply chain officers in the hotels in Nairobi central Business were targeted. The study recommended from the observations that suppliers play an important role in inventory. They should be appraised and company should ensure their timely payments. The study mentioned that for an effective hospitality establishment, it is important to recruit trained and skilled and educated staff. The study also recommended that integration of ICT is crucial to enhance the cost efficiency of the organization. The intervention of technology will reduce the delivery time, enhance the quality of the product for better customer satisfaction. The hospitality industry should also train the employees about use of different techniques and technology in procurement process.
- **Ukabuilu E. N (2018):** Studied ten different hotels in Owerri, Imo State for stock control techniques followed in those hotels. The data for the research was collected with the help of structured questionnaire, which was analysed by the simple statistical tools. The six objectives of the study were based on: whether the hotels follow proper purchasing procedures; proper records are maintained; different items are stored in different equipments, the stock is handled by the trained staff; FIFO method of inventory is followed are not. The hypothesis was formulated and it was

tested by using chi –square test. It was found that hotels do follow most of the formulated objectives. Based on the data analysis, it was concluded that the studied hotels do follow various stock control techniques. It was hence recommended that the hotels should have proper stock control techniques to run effectively.

- **Jacob MuleiNziokaand Dr. Susan Were(2017):** The study was conducted with the help of 100 supply chain officers in Ministry of Education headquarters in Nairobi. The primary data was collected from 100 respondents with the help of structured questionnaire. The statistical tools used were multiple regression and bivariate correlation. There were three theories discussed in the study, which were, inventory theory, stock diffusion theory and inventory and production theory. The main aim of the study was to check the effect of Inventory management techniques on the performance of education sector in Kenya. The results revealed a positive relationship between the two variables. The results mentioned that as the stock levels were managed well, it helped the ministry to avoid stock out, by using the Economic Order quantity technique. It was recommended that, Just in Time was recommended to ensure timely material requirement for better quality products.
- **T.T Amachree, et al (2017):** The study was conducted with Equipment manufacturing firms to check which inventory management strategies can be applied to increase the productivity of the firm. Mostly these firms lack productivity, timely customer demands, low quality product and increased cost., due to lack of robust and well-defined Inventory Management Systems. Also, as these equipment manufacturing firms have lot of inventory items, classification of these items is very essential. The research design selected for this study was surveys and expost- facto. The primary data collection was through a questionnaire and the secondary data was collected from the computerized inventory status file of the three equipment manufacturing firms. Pearson's product moment correlation coefficient and one way was used for data analysis. . Analysis of variance (ANOVA) computer software via Statistical Program for Social Science (SPSS) version 17, ABC analysis and classification of materials was used for code categorization of secondary data. The results of the study indicated that Materials Requirements Planning (MRP) followed by Supply Chain Management (SCM) are the most significant Inventory Management Systems in the manufacturing firms. The study recommended that MRP and SCM should be adopted for class A inventories and classical inventory management system should be implemented for Class B and c class inventory items.
- **Joanna Marie Tuzon – Guarin(2017):** Studiedhousekeeping management practices and standards of selected hotels and restaurants of Ilocos Sur, Philippines. Special emphasis was given on

cleanliness, orderliness, sanitation and safety, facilities/equipment, materials control and effective maintenance and the problems encountered in the housekeeping department. Researcher used questionnaire method to collect data. The analysis was done by calculating means, frequency distribution, percentage and ranking method. The study concluded that the hotels and restaurants in Ilocos Sur are clean, safe to stay. It mentioned about the regular and timely inventory management practices followed by the hotel to prevent the theft, and pilferages. The study also conveyed that the supplies and the required material for cleaning is consumed within the estimated Housekeeping budget.

- **Edwin Sitienei, Florence Memba(2016):** The study was about a cement manufacturing company in Kenya and the effect of Inventory management on the company's profitability. Inventories contribute towards huge funds in any manufacturing company, like holding costs and opportunity cost. For a company's success, Inventory Management plays a vital role. For this study, data was analysed with the help of multiple regression analysis to check the relation between Inventory management and the profit of the company. However the study concluded that there exists a negative relation between inventory and profitability of the firm. The study recommended that the cement manufacturing companies should help a close watch on excessive holding stocks of goods or raw material.
- **David W. Heath (2016):** Mentioned about a few Housekeeping practices which can help improve the productivity of the department. One of the practices was based on Time & Motion study on room attendants. The credit values for the guest room cleaned whether occupied or checkout, were adjusted so that room attendants received twice the credits for cleaning a checkout room than a stayover room. This resulted in increase of productivity levels by 11 percent. The article also mentioned that if a Housekeeping Supervisor inspects a room, cleaned by an attendant on random basis, then checking each and every room cleaned by him, may lead to increase productivity. Also, it said that the room attendants should be paid based on their quality scores.
- **G Raghubalan & Smritee Raghubalan (2015):** In their third edition of Hotel Housekeeping Operations and Management has written chapters on importance of housekeeping department in a hotel, describing about the responsibilities of housekeeper. It mentioned one of the main responsibilities as inventory control of the material required for housekeeping operations. The edition has also a separate chapter on housekeeping inventories which gives details about the material used in housekeeping operations

- **C. Elliott Mest (2014):** Advancement in technology now allow hotels to speed up processes that were tedious in the past. Some of these can be use of RFID to track hotel linen. This cuts doen on the time for linen inventories. Also changing the guest room linen only of the request from the guest and not on daily basis could reduce the laundry cost and also a practice towards environment sustainability. Providing turndown service gives a feeling to the guest, that the room is being serviced on daily basis.
- **Enemu, .O. B And Uwazuruike . J (2012)** Studied and evaluated about the stock control practices in hospitality establishments in Abia State Nigeria. The research revealed that the hospitality establishments in the study area adopt inventory control measures in their operational activities which varies from ABC classification, Economic Order Quantity, , Forecasting, Just-in-Time, Cycle counting, First-in-First-out (FIFO), Two-bin system, Computerized system and Safety stock in the management systems. However, the result mentioned that FIFO (First In First Out) was the most common method used for stock control. The study also revealed that the aim of stock control practices was to gain economic control, environment sustainability, and social aim.
- **Jenkins, Lisa(2012):** In this article, the author discussed about the options of either having an Inhouse laundry or an outsourced laundry is better suitable for an hotel. As laundry is one of the most important functions of housekeeping, one can manage control, if a hotel has an inhouse laundry. However, on the other hand, if the linen is outsourced it provides consistency. One of the suggestions was to have an inhouse laundry for better quality linen.
- **S.P. Bansal, et al:** A development committee of E Pathshala, under MHRD Govt. of India in paper 6, Hotel Housekeeping, module 15, Inventory control and stock taking has given in detail about the inventory control techniques used in stock taking of housekeeping department.

3. Objectives of the study:

- 1 To identify the various methods of Inventory Management in Hotel Housekeeping department.
- 2 To find out the components of Housekeeping Operations.
- 3 To check the impact of Inventory management practices on Housekeeping operations.

4. Hypothesis of the study:

Based on the literature review, following Hypothesis was formed.

Null Hypothesis (H0): There is no significant impact of inventory management practices on Housekeeping operations

Alternative Hypothesis(H1): There is a significant impact of inventory management practices on Housekeeping operations

Reliability Test

Independent Variable: Inventory Management

Reliability Statistics

Cronbach's Alpha	N of Items
.969	12

Dependent variable: Housekeeping Operations

Reliability Statistics

Cronbach's Alpha	N of Items
.925	5

The coefficient of alpha value for all the items (12) of inventory management and housekeeping operations (5 items) is 0.969 and 0.925 respectively. The calculated alpha values for both the constructs are greater than the recommended value of 0.7, hence the instrument is reliable.

5. Research Methodology

5.1 Research Design:

The research design was prepared keeping in line with the objectives of this research. The researcher was interested in understanding various stock taking procedures at the hotel housekeeping department and the impact of these practices on the housekeeping operational performance. As the study is based on housekeeping department, employees, specially the Executive Housekeepers, the Housekeeping supervisors of this department were taken into consideration. As the inventory cycle also involves the purchase and stores department, they were also considered as respondents for this study.

5.2 Sample Design:

Population:

- The population of hotels comprised of 10 hotels of various categories ranging from 5, 4 & 3 star hotels in Pune region.

- b. The population of employees comprised of 100 employees comprising of managerial and associate level from 5, 4 & 3 star hotels in Pune region.

5.3 Questionnaire Design:

A set of questionnaires was prepared with about 25 questions which were based on the objectives of the study. Out of these, the first set of questions was multiple choice questions based on housekeeping inventories. The second set of twelve questions was designed on five-point Likert scale based on Inventory techniques. And the third set of five questions was drafted on five-point Likert scale based on Housekeeping operations.

5.4 Data Collection

- **Primary data:** It was collected with the help of structured questionnaires which was circulated to the Housekeeping employees of various star category hotels of Pune region.
- **Secondary data:** The secondary data was collected from different newspapers articles, journals, published papers on this particular topic, magazines and by searching relevant websites on the internet.

6. Data Analysis and Interpretation:

6.1 From the data collected following interpretation was done on of Housekeeping Inventories:

- The Housekeeping inventories are mostly conducted once in a month.
- Most of the hotels have a separate procedure for recycled (linen) and non-recycled items (eg. Guest room amenities)
- A minimum PAR of 2 is maintained in most of the hotel properties. Some hotels maintain a PAR of 3, and some hotel properties also mentioned a PAR of 4 maintained in their hotels.
- Most of the hotels follow Centralized Purchase systems in their hotels. However, some hotels even have a Hotel level purchase system.

Types of inventories: The Executive Housekeeper is responsible for two types of inventories:

- **Recycled Inventories:** The items which are used repeatedly in housekeeping operations falls under recycled inventories. These includes items like linen, uniforms, most machinery and large pieces of equipment and guest loan items such as irons, ironing boards, hair dryers, heating pads, hot-water bottles and so on.
- **Non-Recycled inventories:** These are not recycled during the course of routine housekeeping operations. Items of non –recycled inventory include most guest amenities, cleaning supplies, and smaller cleaning equipment such as brooms, mops, cleaning cloths, etc.

Methods of Inventory control:

The following are the methods used in Housekeeping department for Inventory control:

- **Physical Inventory:** It means, physically counting of all the operating supplies, equipment and other items in the storage areas. The physically counted items are recorded. This can be done once a week, a month depending on the size of the hotel. The timings for physical counting are fixed and no items are issued from the stores, till the counting is completed. Inventory process or physical stock taking actually involves minimum two personnel from housekeeping department. One person can physically count the systematically arranged stock and other person can record the data on physical inventory form.
- **Perpetual Inventory System:** This method of inventory, involves maintaining a continuous record of all purchases and issued items like mini bar supplies and room's non recycled supplies. It helps us to provide up to date record of stock available on hand at any point of time. It requires involvement of considerable amount of staff, use of technology to maintain the proper system working. It usually used for maintaining selected items such as mini bar supplies etc. It is necessary to tally this with the physical inventory.

Inventory control techniques

The following Inventory Management Techniques were discussed based on least to most impactful techniques followed in hotels.

- **Regular stock taking:** Highest number of respondents agreed that regular stock taking is most impactful technique of Inventory management.
- **Use of technology:** This technique was rated as one of the most impactful one which helps in efficient inventory management
- **Proper storage of linen & guestroom amenities:** This system was also higher rated on its impactfulness in handling inventories

Other Inventory control techniques which has an higher impact on controlling inventories were as follows:

- **FIFO (First In First Out)**
- **EOQ (Economic Order quantity)**
- **Setting of PAR stock**
- **Control on misuse of linen and amenities**

Some of the following Inventory control techniques which has an impact on stock management are given as follows

- **Audit**
- **ABC Analysis**
- **Accurate Forecasting**
- **Spot check**
- **Proper Supervision by housekeeping supervisors**

6.2 From the data collected following interpretation was done on of Housekeeping Operations:

As housekeeping is a round the clock operations, it is imperative for the executive Housekeeper to plan and organize the work for the smooth and efficient functioning of the department. Following are the major operations identified for the Housekeepers:

- Division of work: The Executive Housekeeper should consider all the public areas, employee area into consideration and then distribute the work to the housekeeping staff.
- Area Inventory lists: This is the list of all items and surfaces within a particular area which needs cleaning and maintenance.
- Preparing frequency schedules: These schedules gives an idea about the frequency of cleaning an area depending upon the requirement. This list has to be made with minute details.
- Performance standards/ SOP: These are prepared so that standardized methods of cleaning are followed by all housekeeping employees.
- Productivity standards: These mentions the quantity of work which is expected from an employee to perform the tasks given.
- Equipment & Operating supply inventory levels: Once all SOPs are set, the staff is trained to follow the procedure. Also to ensure that all the material required (inventory) is available to perform housekeeping operations. This involves, determining the PAR levels.
- Work Schedules: Once all the above planning is done, the Executive Housekeeper has to ensure that the schedule is prepared to be followed by the staff.

6.3 To find the impact of inventory management on housekeeping operations simple regression has been applied using SPSS software. The details of analysis are as follows:

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.923 ^a	.852	.850	.4006999

a. Predictors: (Constant), Inventory Management

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	84.012	1	84.012	523.241	.000 ^b
	Residual	14.611	91	.161		
	Total	98.623	92			

a. Dependent Variable: Housekeeping Operations

b. Predictors: (Constant), Inventory Management

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.108	.173		.628	.532
	Inventory Management	.968	.042	.923	22.874	.000

a. Dependent Variable: Housekeeping Operations

The $F(1,91)=523.241$, $p=0.000<0.05$, So, it has sufficient evidence to reject the null hypothesis. Hence, alternative hypothesis is accepted. It means there is a significant impact of inventory management on housekeeping operations. Also the adjusted R square value is 0.85. This shows that 85% variation in the housekeeping operations is explained inventory management. The regression equation of housekeeping operations on inventory management is

$$\text{Housekeeping Operations (Y)}=0.108+0.968*\text{Inventory Management(X)}$$

7. Conclusion of the study:

- Results of this study show that, though all hotels follow the inventory management process.
- Use of technology, timely stock taking and proper storage of inventory are the most important techniques to follow inventory.
- FIFO, EOQ, maintaining PAR stock and control on misuse of linen are the second most likely practices that the hotels follow to control their inventories.

- Regular departmental audits, spot checking, forecasting and supervision are also followed so that the inventory is managed properly.
- The application of simple regression analysis helped in finding out that proper inventory management has a significant impact on housekeeping operations. Which means that if the inventories are handled properly, it will definitely lead to the smooth functioning of the housekeeping department.

8. Recommendations:

- While it is apparent that the hotels are following, inventory management techniques, the Executive Housekeeper should establish reasonable levels for both recycled and non-recycled inventories.
- Overstocking should be avoided, as it ties up cash and calls for a larger storage area.
- There should be an effective purchasing system to consistently maintain the inventory levels set by the executive housekeeper.
- To maintain the inventory levels, the executive housekeeper needs to determine the par level for each inventory item.
- Advancement in Technology should be applicable to inventory techniques to maximize the efficiency of stock taking procedure. For eg, use of RFID (Radio Frequency Identification)

9. References & Bibliography:

- Abuya, M. B., & Shale, N. I. (2018). ROLE OF INVENTORY MANAGEMENT PRACTICES ON PERFORMANCE OF THE HOSPITALITY INDUSTRY IN. *The Strategic Journal of Business & Change Management*, 5 (2), 1649-1673
- C. Elliott Mest (2014), Technology streamlines housekeeping, *Hotel Operations*, pg 26.
- David W. Heath (2016), Housekeeping best practices help improve productivity.
- Edwin Sitienei, Florence Memba. (October 2015 - March 2016). The Effect of Inventory Management on Profitability of Cement Manufacturing Companies in Kenya: A Case Study of Listed Cement Manufacturing Companies in Kenya. *International Journal of Management and Commerce Innovations*, 3 (2), 111-119.
- Enemuo, .O. B And Uwazuruike . J. (2012). Contribution Of Stock Control Practices To The Sustainability Of Hospitality Establishments In Abia State, Nigeria (Vol. 12). *Nigeria: Journal of Agriculture and Social Research*
- G Raghubalan and Smritee Raghubalan , *Hotel Housekeeping Operation and Management Third edition*

- Jacob MuleiNzioka, Dr. Susan Were. (2017). Effect Of Inventory Management. International Journal of Novel Research in Education and Learning, 4 (6), 48-59.
- Jenkins, Lisa (2012), HOTEL LAUNDRY IN HOUSE OR OUTSOURCED?Caterer &Hotelkeeper; Vol. 202 Issue 4711, p38-40, 3p.
- Joanna Marie Tuzon – Guarin. (2016). Housekeeping Management Practices And Standards Of Selected Hotels And Restaurants Of Ilocos Sur, Philippines. International Journal of Business, 6 (3), 98-103.
- Peter Jones and Abhijeet Saig (2009) A re-examination of the factors that influence productivity in hotels: A study of the housekeeping function.Tourism and Hospitality Research,Vol. 9, 3, 224–234
- T.T Amachree, E.O.P. Apkan, E.C. Ubani, K.A. Okorochoa, A. C. Eberendu. (2017). Inventory Management Strategies For Productivity Improvement In Equipment Manufacturing Firms. International Journal Of Scientific & Technology Research, 6 (8), 99-107.
- Ukabuilu E. N. (2018). Examination of Various Stock Control Techniques in Selected. Journal of Tourism, Hospitality and Sports, 33, 12-28.
- <https://epgp.inflbnet.ac.in>
- <https://india.oup.com>