INVENTORY MANAGEMENT TECHNIQUES OF HEAT STORES IN METRO MANILA: BASIS FOR IMPROVEMENT OF INVENTORY MANAGEMENT SYSTEM

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ABSTRACT

This study delved into the intricacies of inventory management within HEAT stores, presenting a comparative analysis of Barcode and Manual Inventory Management systems. The primary objective is to glean insights that can enhance current inventory practices, taking into account the perspectives of employees experienced in inventory management. The study's methodology involved meticulously creating survey questions and drawing on pertinent literature to ensure precision and validity. The questionnaire, distributed among HEAT store employees, encompassed demographic profiles, awareness of infrared barcode scanners, and evaluations of barcode performance versus manual inventory systems. The data collection process, employing online forms and sheets, offered flexibility to respondents. Preceding their responses, participants received a briefing on the questionnaire, and a week was allotted for submission to minimize disruption to their work. The statistical analysis plan encompassed comprehensive data processing using SPSS software, involving data cleaning, centralization, encoding, and filtering. The results were interpreted by an expert statistician and presented in a format accessible to the target audience. Demographic profiling revealed a concentration of respondents in their thirties, indicating potential professional maturity. The gender distribution was balanced, and diverse job designations provided a holistic view of the workforce. In assessing the scope of Barcode Inventory Management, respondents exhibited a unanimous consensus, emphasizing its advantages in processing speed, real-time access to inventory levels, and sales information. In contrast, Manual Inventory Management presented a more nuanced perspective, signifying challenges and a predominant preference for digital inventory systems. The analysis of time efficiency underscored a unanimous belief in the superior efficiency of Barcode Inventory Management compared to manual methods. Respondents acknowledged the time-consuming nature of manual tracking systems, aligning with previous studies. Cost considerations further emphasized the perceived advantages of Barcode Systems, with a consensus on the essential nature of quality software and the company's willingness to invest in modern inventory tools. Manual Inventory Management received a more mixed assessment, acknowledging its potential benefits in precision and control. Comparisons between employees and managers in assessing modern and manual systems revealed consistent perceptions across scope, time, and cost. The lack of statistical significance suggests a uniformity in how both groups perceive these inventory management methods. In conclusion, the study provides valuable insights into the preferences and perceptions of HEAT Store employees regarding inventory management methods. The recommendations include investments in barcode technology, targeted training programs, strategic planning for manual inventory, and continuous monitoring. By incorporating these recommendations, HEAT stores can optimize their inventory practices, leveraging technological advancements for increased efficiency and competitiveness in the market.

Keywords: management techniques, heat stores, inventory management system, manual inventory

INTRODUCTION

Effective inventory management is crucial for any business dealing in material goods. Proper inventory management, from ordering to tracking and storing, directly impacts profits and can reduce taxes. An improved tracking system is preferred, less reliant on human error and more on digital means. The use of heated tobacco products has been around for decades. Tobacco heating, as opposed to smoking, has been discussed since at least the 1980s. However, the initially heated tobacco brands and their heated tobacco products fell short of what adult users needed. Company A spent approximately 6 billion United States Dollars and over ten years researching and developing smoke-free goods, including HEAT. More than 400 researchers and engineers simultaneously collaborated to evaluate and improve smoke-free alternatives (HEAT, 2023).

In fact, HEAT' goal is to swiftly and entirely substitute cigarettes with smoke-free products. Without a doubt, the best course of action is never to start smoking or to stop entirely. Adult smokers who want to keep using tobacco should be aware that not all products containing tobacco are created equal. For individuals who would otherwise continue to smoke or use other nicotine products, the company is convinced that their smoke-free products are preferable to continuing to smoke (HEAT, 2023). And because of this, they are reforming the business and laying the foundation for a smoke-free future by attempting to do away with cigarettes.

Any company dealing in material goods must understand the need for effective inventory management. Everything that has to do with the products is considered part of inventory management, from ordering on time to receiving, tracking, and storing them correctly. Errors in this area directly affect profits, so it's crucial to get them right. Profits are increased, and in some cases, taxes are decreased, owing to better inventory management. The researcher has noticed that an improved tracking system, which is less reliant on human error and more on digital means, is preferred. In light of this, she sought to explore how she may enhance HEAT stores in general and their inventory management in particular.

Technology's influence and presence may be seen in many aspects of modern life. The introduction of technology has sped up and simplified all operations. Barcode is one of the technologies presently being used by several businesses. A barcode system can be integrated into the store's management. It is possible to decrease human error and offer precise data in real-time by placing barcodes into each phase of the store management system's process (Istiqomah et al., 2020). Using barcodes not only aids in integrating each process but also improves the inventory management system's success. Despite this, human handling or manual inventory is still used in several stores.

Barcodes are low-cost, easy-to-use data storage devices that have increased in prevalence and application over the past few decades. Barcodes can store product identification numbers, contact information, URLs, and point locations (Focardi et al., 2018). A barcode scanner is an optical device with imaging and processing capabilities (camera and CPU) that extracts data from a barcode image (Denso Wave, 2017).

The proliferation of smartphones with high-resolution cameras has enabled mobile applications to decode barcode images and provide additional features such as exchanging contacts, messages, and URLs. However, barcodes may also serve as an entry point for malware and virus attacks that infect scanners. Attackers can gain complete control of the user's device and resources by exploiting software vulnerabilities in the scanner. These applications may violate users' or stores' privacy if they have access to their personal information (Focardi et al., 2018b). Some smartphone barcode scanners advertise themselves as "secure" or "privacy-friendly" (Wahsheh & Luccio, 2019).

In this paper, the researcher evaluated the performance of an infrared barcode scanner versus traditional manual inventory practices. The researcher investigated the characteristics of barcode readers, categorize them, and highlight their limitations.

Therefore, the researcher desired to study adopting an infrared barcode scanner in selected HEAT stores in Metro Manila to enhance their inventory management system.

OBJECTIVES OF THE STUDY

The study aimed to explore how implementing infrared barcode scanners and digital inventory systems at IQOS Retail Stores affects inventory management, offering insights into potential improvements and challenges in the retail context.

1. To determine if there are significant differences in the performance of infrared barcode scanner and manual inventory in IQOS Store inventory management.
2. To evaluate the impact of the IQOS Retail Store's digital inventory management installation in Metro Manila on their existing inventory practices.
3. To determine recommendations needed for improving the Inventory Management System.

METHODOLOGY

This chapter details the research design and methodology employed in investigating inventory management methods in HEAT Stores. The study adopted a descriptive quantitative approach, employing versatile data collection methods, meticulous data cleaning, and robust statistical analysis. Participants from various HEAT Stores in Metro Manila could choose between pen-and-paper surveys and online data submission, ensuring maximum participation and accommodating preferences. The collected data underwent comprehensive cleaning, transformation, and centralization to create a standardized and integrated dataset. Statistical analysis was conducted using SPSS, encompassing descriptive and inferential statistics, with expert statisticians interpreting results comprehensively to enhance credibility. The settings of the study are outlined, specifying the HEAT Stores in Metro Manila that participated in the research from November 1 to December 15, 2023. The rationalization for selecting HEAT Stores as the study site is justified based on contextual appropriateness and the potential for valuable insights. The chapter also provides an overview of the participants, inclusion/exclusion/withdrawal criteria, sampling size and technique, and the research instrument. Lastly, the institutional ethics review, declaration of conflict of interest, and detailed ethical considerations and protections for participants throughout the research process are discussed, ensuring the study adheres to ethical standards and principles.

Research Design. The research design for this study is a descriptive quantitative approach that combines versatile data collection methods, meticulous data cleaning, and rigorous statistical analysis to investigate inventory management methods in HEAT Stores. Participants could choose between pen-and-paper surveys and online data submission for data collection, ensuring maximum participation and accommodating preferences. Data underwent comprehensive cleaning, transformation, and centralization to create a standardized and integrated dataset. Statistical analysis was performed using SPSS, encompassing descriptive and inferential statistics. Expert statisticians interpreted results comprehensively, enhancing the study's credibility. Findings were presented through visualizations and comprehensive reporting, ensuring data quality and providing valuable insights into inventory management practices.

Sources of Data. The participants of the study were a total of twenty-one (21) respondents from all selected HEAT stores in Metro Manila, specifically the following stores: HEAT Boutique Stores, Bonifacio High Street (1), Eastwood City Walk (2), Estancia Mall (1), Robinsons Galleria (1), SM Mall of Asia (2), SM Southmall (1), HEAT Pop-Up Stores (1), Ayala Manila Bay (1), Festival Mall (1), Glorietta (2), Robinsons Place Manila (1), SM Aura (1), Fairview (1), SM Megamall (2), The Podium (1), SM North Edsa (1), and Grand Central (1).

Instrumentation and Data Collection. The researcher carefully constructed the question on their own, drawing on the relevant readings for the study to ensure the reliability and accuracy of the results, and underwent Cronbach's alpha analysis. The researcher thoroughly reviewed the questions to ensure they were correct and pertinent to the study and research. The researcher emphasized precision and contextual relevance in the study's questions, making the questionnaire clear and straightforward. The survey statements

represented contexts and circumstances in which respondents' responses varied according to their familiarity with inventory management systems.
The survey questionnaire had two parts, the first of which focused on the respondent's demographics. The second part compared the performance of employing infrared barcode scanners to the manual approach to inventory in terms of scope, time, and budget. A four-point Likert scale (strongly disagree, disagree, agree, and strongly agree) was used to rate the degree to which respondents agreed or disagreed with each statement.
After that, statisticians and language professors verified the validity and reliability of the survey questionnaire before it was sent out to the respondents.

A survey was distributed to qualified employees of selected HEAT Stores in Metro Manila to collect data for this investigation. The data gathered was tabulated, statistically treated, and interpreted.Instrumentation – Discuss the different parts of the instrument, i.e. questionnaire

Tools for Data collection. The researchers used Google form link.

RESULTS AND DISCUSSIONS

1. Respondents' demographic profiles in terms of Age, Sex, Years in the service, and Designation

The demographic profile of respondents indicates a concentration of individuals in their thirties, suggesting potential professional maturity within this age group. The gender distribution is relatively balanced, and diverse job designations provide a comprehensive understanding of the workforce within the studied context.

Respondents rated the performance of an infrared barcode scanner and manual inventory management in terms of Scope, Time, and Cost:

In terms of scope, the comprehensive examination of Barcode Inventory Management aligns with prior studies, confirming a unanimous and favorable consensus among respondents. The positive reception of barcode technology is supported by the immediate advantages highlighted, such as swift processing speed and real-time access to inventory levels, echoing findings from previous studies (Marker, 2019; Khan et al., 2019; Hanna, 2022; Awasthi et al., 2023).

2. Significant difference in the level of manual assessment to modern inventory management

In contrast, Manual Inventory Management reveals a more varied perspective, deviating from the predominantly positive outlook on barcode systems. Despite some agreement on certain aspects, the overall sentiment leans towards disagreement with manual inventory management, aligning with the broader literature on the advantages of technological advancements in inventory management.

Regarding time efficiency, the statistical analysis aligns with previous studies, indicating a unanimous belief among respondents that barcode technology offers a more time-efficient solution for inventory management. The nuanced perspective on manual inventory time efficiency corresponds with insights from Magbanua (2021) and Wroblewski (2020), emphasizing manual tracking systems' challenges and time-consuming nature.

The evaluation of cost considerations aligns with the broader literature, emphasizing the perceived advantages of barcode systems in terms of accuracy, efficiency, and overall cost-effectiveness, while acknowledging certain benefits of manual inventory management in specific contexts. The strong consensus favoring barcode systems echoes findings from previous studies, highlighting the critical role of barcode recognition in data accuracy and preventing errors.

The statistical analysis comparing the scope, time efficiency, and cost of modern (barcode) and manual inventory management systems reveals consistent perceptions among employees and managers. While both groups generally rate barcode systems higher, the lack of statistical significance suggests that any differences in perceptions were insignificant within the studied sample. Further exploration or a larger sample size may provide more nuanced insights into variations

in perspectives between employees and managers regarding modern and manual inventory.

3. **Significant difference between the employees' and managers' assessments of using manual and infrared barcode scanners for inventory management**

Overall, the study contributes to the existing literature by providing nuanced insights into the dynamics of inventory management systems in the context of HEAT stores. The findings can inform decision-makers about the preferences and challenges associated with different inventory management methods, guiding potential improvements in operational efficiency and technology adoption. Further qualitative exploration or larger sample sizes may provide deeper insights into the variations in perspectives among employees and managers.

Recommendations for the improvement of the Inventory Management System:

Based on the comprehensive examination of Barcode and Manual Inventory Management, several recommendations emerge to enhance inventory practices and improve overall efficiency in HEAT stores; HEAT stores are strongly advised to invest in modern barcode technology, incorporating quality software for scanners. Recognizing potential employee resistance, targeted training programs focusing on the advantages and ease of barcode systems are crucial for a smooth transition. Integration with leading inventory control solutions is recommended for enhanced functionality. While barcode systems are preferred, strategic planning for manual inventory in specific contexts is acknowledged. Establishing continuous monitoring mechanisms and feedback loops will ensure adaptive strategies. A thorough cost-benefit analysis is essential before transitioning, considering factors such as initial investment and long-term savings. Customized implementation plans based on job roles and exploration of mobile solutions for flexibility complete the recommendations, promising increased efficiency and competitiveness for HEAT stores.

CONCLUSIONS

In conclusion, the study provides valuable insights into the preferences and perceptions of HEAT store employees and managers regarding barcode and manual inventory management. The demographic profile analysis offers context to the findings, emphasizing the importance of understanding the workforce's characteristics. The assessment of barcode systems demonstrates a strong consensus on their advantages, aligning with existing literature. Conversely, manual inventory management presents challenges, indicating a preference for digital solutions.

The statistical analyses confirm the significant differences between barcode and manual systems in terms of scope, time, and cost. The consistent perceptions between employees and managers suggest a shared understanding of the benefits of barcode technology within the studied sample.

RECOMMENDATIONS

To enhance operational efficiency and competitiveness, HEAT stores should prioritize investment in modern barcode technology complemented by high-quality software for scanners. This strategic initiative is poised to streamline inventory processes, improve accuracy, and facilitate real-time access to inventory levels. By leveraging barcode technology, HEAT stores can significantly enhance operational efficiency, reduce manual errors, and optimize inventory management practices.

The recommendation to implement modern barcode technology resonates with the unanimous consensus among respondents regarding its advantages over manual inventory management. Swift processing speed, real-time access to inventory data, and improved accuracy are cited as immediate benefits, underscoring the potential transformative impact of barcode systems within HEAT stores.

Furthermore, integrating barcode technology with leading inventory control solutions is advised to maximize functionality and effectiveness. This integration will enable seamless synchronization of inventory data across various

platforms, facilitating smoother operations and enhancing decision-making processes.

To ensure successful adoption, comprehensive training programs for employees should be prioritized. These programs should focus on familiarizing staff with barcode technology, emphasizing its advantages, and providing hands-on training to optimize usage. Employee buy-in and proficiency are critical factors for successfully implementing any new technology.

In addition, establishing continuous monitoring mechanisms and feedback loops is essential to facilitate ongoing improvement and adaptation. By soliciting feedback from employees and managers, HEAT stores can identify areas for refinement and address any challenges encountered during the transition to barcode technology.

Before implementing barcode technology, a thorough cost-benefit analysis is recommended to assess its financial viability and long-term impact on operations. While the initial investment may be substantial, the potential savings, efficiency gains, and competitive advantages of barcode technology justify the expenditure.

Overall, investing in modern barcode technology represents a strategic opportunity for HEAT stores to optimize inventory management practices, enhance operational efficiency, and maintain a competitive edge in the market. By embracing technological innovation, HEAT stores can position themselves for sustained growth and success in an increasingly dynamic retail landscape.

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