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## Warehouse Management System and Business Performance

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### **Abstract :**

A warehouse inventory system is crucial for controlling the movement and storage of materials within an operation and processing associated transactions. It involves tracking inventory with a license plate number (LPN), which is assigned to the associated unit in the warehouse and updated every time the unit is moved. Implementing a warehouse management system (WMS) can increase inventory accuracy, reduce labor costs, and improve the ability to serve customers by reducing cycle times. WMS also supports companies in meeting FDA regulations through tighter inventory controls, better information tracking, and improved accounting processes. The high number of SKUs in warehouse inventory can lead to problems in loading trucks and putting away production, but WMS can help alleviate these issues by providing a more organized and efficient system.

**Keywords**— Management Information System (MIS), Warehouse Management System (WMS), Logistics Information System, Barcode, Regional Distribution Centre.

### **Introduction**

Introduction to warehouse inventory involves understanding the importance of proper inventory management in a warehouse setting. It includes the use of inventory control systems, such as barcodes or radio-frequency identification (RFID) tags, to track inventory levels and locations. The primary goal of warehouse inventory management is to ensure that the right products are available in the right quantities at the right time, while minimizing costs associated with holding inventory. Effective warehouse inventory management can lead to improved customer satisfaction, reduced stockouts and overstocks, and increased efficiency in warehouse operations. It involves several key activities, such as forecasting demand, receiving and put-away of inventory, picking and shipping orders, and conducting regular cycle counts and physical inventories. In addition, warehouse inventory management can be integrated with other supply chain functions, such as production planning and scheduling, transportation management, and order fulfillment. This integration can help to optimize inventory levels and reduce overall supply chain costs.

### **METHODOLOGY**

Methodology for warehouse inventory involves a systematic approach to managing and controlling the flow of goods within a warehouse. This includes tracking inventory levels,

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optimizing storage space, and ensuring efficient picking and packing processes. A common methodology used in warehouse inventory management is the first-in, first-out (FIFO) approach, which prioritizes the oldest inventory for picking and shipping to ensure product freshness and reduce the risk of obsolescence. Other methodologies include just-in-time (JIT) inventory, which aims to minimize inventory levels and reduce waste, and the use of demand forecasting to anticipate future inventory needs. Additionally, automation and technology solutions, such as barcode scanning and automated storage and retrieval systems, can be implemented to increase efficiency and accuracy in warehouse inventory management. Regular audits and performance metrics can also be used to evaluate the effectiveness of the warehouse inventory methodology and make improvements as needed.

### **CASE DESCRIPTION**

One example is a case study of a 600,000 sq. ft. fulfillment center that implemented a warehouse management system (WMS) to improve operations and increase efficiency. The study found that the implementation required adaptations within each department, such as inbound, inventory control, outbound, and shipping, to transform manual processes into automated ones that support the WMS. However, there were also configurational oversights within the WMS that led to time-consuming complications when performing daily operational tasks. Another example is a case study of a North American consumer retail brand that used Hopsack's warehouse automation and execution system to automate the packing and labeling process around Section 321 and PAPS, which improved cross-border fulfillment efficiency. Additionally, a leading global provider of logistics solutions, Kuehne Nagel, was involved in planning a new warehouse for one of their clients. The project included the development of the best algorithm for multi-order picking, which was planned to be served by workers with trolleys.

These case descriptions demonstrate the importance of proper warehouse inventory management and the potential benefits of implementing automated systems and algorithms to improve efficiency and reduce costs.

### **CONFIGURATION**

Configuration of warehouse inventory involves the design and layout of the warehouse space to optimize the storage and movement of inventory. This includes the placement of storage racks, aisles, and workstations, as well as the implementation of inventory management systems and technologies. The configuration should take into account the types and volumes of inventory, the frequency of picking and replenishment, and the flow of materials and information throughout the warehouse. The goal is to create an efficient and effective warehouse system that minimizes handling time, reduces errors, and maximizes productivity. This can involve the use of automated storage and retrieval systems, barcode scanning, pick-to-light technology, and other tools to streamline warehouse operations. Ultimately, the configuration of warehouse inventory should support the overall business goals and strategies of the organization.

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### HOST INTERFACES

The host interface of a warehouse inventory system refers to the connection between the warehouse management system (WMS) and the host system, which is typically an enterprise resource planning (ERP) or an inventory management system.

A well-designed host interface can provide several benefits, including:

- Improved accuracy and efficiency in inventory management
- Real-time visibility into inventory levels and order status
- Streamlined order processing and fulfilment.
- Enhanced communication and collaboration between departments • Better decision-making through data-driven insights

### INBOUND LOGISTICS

Inbound logistics for warehouse inventory refers to the process of receiving and storing raw materials and components needed for production. This process involves managing the flow of goods from suppliers to the company's warehouses or production facilities, and includes activities such as sourcing, purchasing, transportation, and storage.

### OUTBOUND LOGISTICS

Outbound logistics in warehouse inventory refers to the processes and activities involved in moving products from a company's warehouse or production facility to its customers.

To measure the success of outbound logistics operations, it's critical to track relevant Key Performance Indicators (KPIs). Some common KPIs include:

- Perfect order rate: the percentage of orders delivered in full, on time, and without errors.
- On-time delivery rate: the percentage of orders delivered on or before the promised delivery date.
- Inventory turnover: the number of times inventory is sold and replaced within a given time period.
- Transportation cost per unit: the cost of transporting each unit of product.

### INVENTORY MANAGEMENT

Inventory management of warehouse inventory involves the processes and strategies used to control and optimize the storage and movement of goods within a warehouse or distribution center. This includes automation, AI-powered demand forecasting, robotics, blockchain, and sustainable practices. Automation reduces manual errors and enables real-time tracking, leading to improved efficiency and accuracy. AI-powered demand forecasting analyzes vast amounts of data to predict customer demand accurately, allowing businesses to optimize inventory levels and avoid stockouts. Robots automate repetitive tasks, leading to increased productivity and reduced operational costs. Blockchain ensures transparent and tamper-proof records of the supply chain, enhancing traceability and reducing the risk of fraud and counterfeiting. Sustainable practices include eco-friendly packaging materials, optimizing transportation routes,

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and minimizing waste to reduce the carbon footprint. In 2023, sustainable and smart warehousing, simulation software programs, predictive analytics, and gamification are expected to have a significant impact on managing warehouse inventory.

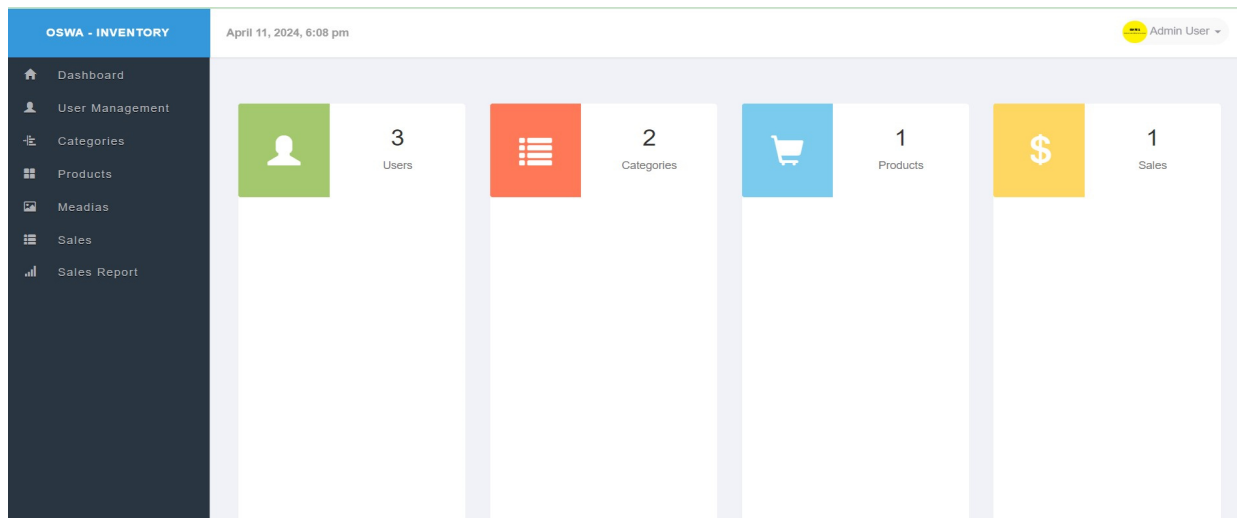
### **MANAGEMENT REPORTING**

Management reporting of warehouse inventory involves generating up-to-date and accurate reports on inventory levels, turnover, and other key performance indicators (KPIs). These reports help managers make informed decisions about inventory management, such as when to reorder stock, how much to order, and how to optimize warehouse space. Effective management reporting requires real-time visibility into inventory levels and movements, which can be achieved with inventory management software and barcode scanners. This technology enables warehouse personnel to track inventory as it moves in and out of the warehouse, and to update inventory records in real-time. Management reports can be customized to meet the specific needs of different departments and stakeholders. For example, financial reports may focus on inventory carrying costs and turnover, while logistics reports may focus on order fulfillment accuracy and speed. Management reporting can also help identify trends and patterns in inventory management, such as seasonal fluctuations in demand or recurring stockouts of certain items. By analyzing these trends, managers can take proactive steps to optimize inventory levels and improve overall supply chain efficiency.

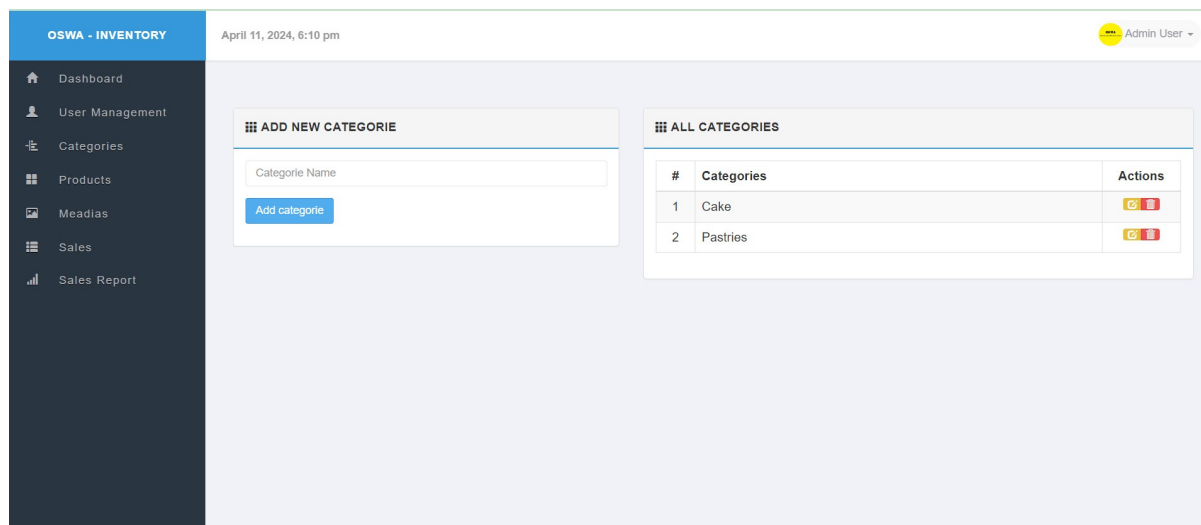
### **CASE ANALYSES AND DISCUSSION**

One example of a successful warehouse inventory management implementation is Nature's Best, a health and natural foods distributor. Nature's Best was facing high labor costs due to the inefficiencies of transporting temperature-controlled food products between four buildings on its DC campus. Additionally, the company's zones were organized to suit either small or large clients, leading to each product being touched 18 times on its way to the customer. To address these challenges, Nature's Best turned to Envisat, a supply chain consulting and IT services firm. Envisat used its consult, implement, and operate (CIO) methodology to create a customized solution for Nature's Best. This included conducting a material flow analysis and redesigning the internal flow processes to increase efficiency. As a result, Nature's Best was able to consolidate its operations to one distribution center (DC) and implement a global WMS that addressed all of its concerns. The new system reduced labor costs by over 30 percent and more than doubled productivity. Ninety-seven percent of full-time employees were retained, and temporary and non-value-added positions were eliminated. Nature's Best went consultant-free only four weeks after go-live.

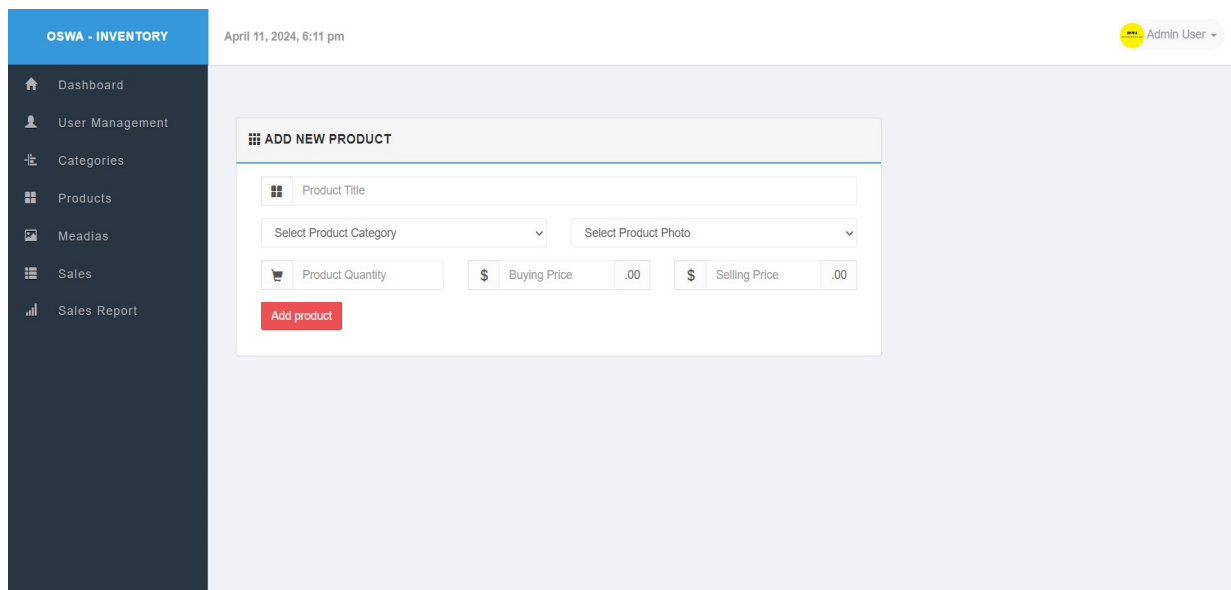
### **RESULT**



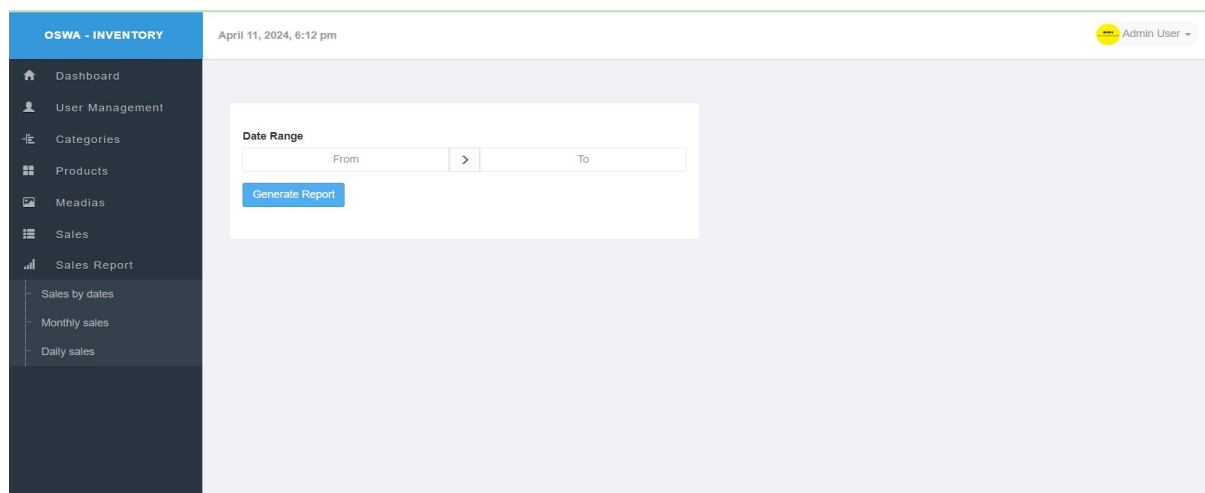
This is a dashboard page which displays all the users, categories, products and sales of that warehouse.



This is a categories option where users can add different categories of their products and also able to delete them whenever not in use.



Here users can add products. They can add product categories and add product photo, quantity, buying price and selling price.



This page shows the sales report. There are different types of sales reports sales by dates, monthly sales, daily sales.

## CONCLUSION

The study of warehouse inventory systems is a critical aspect of supply chain management, as it enables efficient and effective storage and movement of goods. The configuration of a warehouse inventory system, including inbound and outbound logistics, host interface, and management reporting, can significantly impact its performance. The use of technology, such as Warehouse Management Systems (WMS), can enhance inventory control, order management, and system reliability. The choice between traditional manual warehousing and automated approaches depends on various factors, including cost, efficiency, and availability of manual



labor. Overall, effective warehouse inventory management can lead to improved customer satisfaction, reduced costs, and enhanced productivity.

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