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المدرسة العليا في العلوم التطبيقية
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Thème

Development of a Warehouse Management System for cross-Docking Operations: A Case Study I Shoe Distribution.

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Dedication

I dedicate this modest work to my family: my dear parents, my sister, and my brothers for their encouragement and support during my years of study; To my dear friends; To my professors without exception for their efforts over these five years of study to ensure a solid education.

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General Introduction:

In the dynamic landscape of Algeria's shoe industry, effective supply chain management is pivotal for maintaining competitiveness and meeting evolving consumer demands. This graduation project aims to develop a specialized ERP system designed for wholesale distribution, focusing on enhancing efficiency through cross-docking operations. Cross-docking, a strategic logistics practice, involves the direct transfer of goods from inbound to outbound shipments, minimizing storage costs and reducing delivery times significantly.

The primary objective of this project is to streamline operations within Algeria's shoe industry by implementing an ERP system that optimizes supply chain logistics, reduces transportation costs, increases traceability, and enhances overall operational efficiency. By integrating advanced features for inventory management, order processing, and real-time analytics, the ERP system will empower shoe distributors to manage inventory more effectively, coordinate logistics seamlessly, and respond swiftly to market demands.

Through this initiative, we seek to demonstrate how technology-driven solutions can revolutionize traditional distribution practices in the Algerian shoe industry. By adopting modern ERP capabilities tailored to the unique needs of wholesale distribution and cross-docking operations, we aim to facilitate smoother operations, improve service reliability, and ultimately contribute to the industry's growth and competitiveness.

Chapter 1

Supply chain and Cross docking platform.

Chapter 1:

Supply Chain Management Cross-Ducking Platform.

Introduction:

Supply chain management (SCM) and logistics platforms are integral to modern business operations, encompassing the strategic coordination and integration of activities from procurement to distribution. SCM focuses on optimizing processes such as demand forecasting, procurement, production planning, logistics, and distribution to streamline operations, minimize costs, and meet customer demands efficiently. Logistics platforms provide the technological backbone for managing these processes, offering tools for transportation management, warehouse optimization, order fulfillment, real-time tracking, and analytics. Together, SCM and logistics platforms enable businesses to enhance operational efficiency, improve inventory management, optimize transportation routes, and ensure timely delivery of goods and services. In today's competitive landscape, effective SCM and logistics platforms are crucial for businesses aiming to achieve agility, cost-effectiveness, and customer satisfaction while navigating global supply chain complexities and leveraging data-driven insights to drive continuous improvement and strategic decision-making.

1.Supply Chain

1.1 Supply Chain Definition:

A supply chain is defined as a network of individuals, organizations, resources, activities, and technology involved in the creation and sale of a product or service. It encompasses the entire process from the sourcing of raw materials to the delivery of the finished product to the end user. Key components of a supply chain include producers, vendors, warehouses, transportation companies, distribution centers, and retailers. Functions within the supply chain span product development, marketing, operations, distribution, finance, and customer service. Effective supply chain management aims to optimize these processes to achieve lower costs, faster production cycles, and increased competitiveness. Today, many supply chains operate globally, integrating various business processes across different regions to enhance efficiency and responsiveness to market demands.

1.2. Supply Chain Management :

Supply Chain Management (SCM) is the process of managing the flow of goods and services from the initial stage of acquiring raw materials to the final stage of delivering the finished product to the end consumer. It involves coordinating and integrating various activities within and among organizations to ensure the efficient movement of products and services from the point of origin to the point of consumption. SCM aims to optimize the supply chain to reduce

costs, improve efficiency, and enhance customer satisfaction by minimizing waste and maximizing value, this figure below gives supply chain description.

Figure 1- Supply chain process

1.2.1 Key aspects of SCM:

Planning: Determining what needs to be produced, in what quantities, and when.

Sourcing: Acquiring raw materials and components from suppliers.

Production: Transforming raw materials into finished products.

Distribution: Transporting products from the manufacturing site to the point of sale or consumption.

Returns: Managing the return of products due to defects or other reasons.

1.3 Inventory management introduction:

In the realm of industrial or commercial enterprises, inventory management stands as a pivotal function. Its effectiveness hinges on maximizing profits and minimizing costs through strategic techniques. These methods aim to stabilize operations by mitigating fluctuations and disruptions. By employing various strategies such as forecasting, planning, and product classification, businesses can optimize their inventory processes. This approach ensures that resources are allocated efficiently, enhancing overall operational efficiency and profitability.

1.3.1 Type of Inventories:

Raw Materials: These are the unprocessed inputs needed to manufacture a product. They form the starting point in the production process.

Work-in -progress (WIP): This category includes goods that are partially completed during the production process. Managing WIP inventory is crucial for optimizing production timelines and resource allocation.

Finished Goods: Once a product has been completely produced according to specifications, it moves from the production line to the finished goods inventory. This inventory is ready for distribution to retailers or direct to consumers.

Maintenance, Repair, and Overhaul (MRO) Inventory: This type of inventory consists of spare parts, tools, and other supplies needed for the maintenance and repair of equipment and facilities. Efficient management of MRO inventory is vital for minimizing downtime and extending the life of assets.

1.3.2 Inventory Management Techniques:

Inventory management is the process of ordering, storing, and using a company's inventory, including raw materials, components, and finished products, it involves several techniques such as:

-Inventory rotation or Inventory turnover:

Inventory turnover measures how efficiently the enterprise manage its stocks, it quantifies the rate at which a company sells and replaces its inventory over a given period, directly correlating with the company's ability to balance inventory levels to meet customer demand without accumulating excessive stock that incurs holding costs.

The formula for calculating the inventory turnover ratio is as follows:

RS = Cost of Goods sold / Average value of inventory.

RS = Turnover / Average value of inventory.

Average stock = (initial stock + ending stock) ÷ 2.

-Stock Turnover Duration:

refers to the average length of time it takes for a company to sell its entire inventory.

Stock turnover duration (TOD) = Number of Days in the Period / Inventory Turnover Ratio.

-ABC Analysis:

The ABC analysis is a method that categorize products into three groups (A, B and C) based on their economic importance to the enterprise. this approach help business optimize their stock by focusing on the most valuable products.

Category A: These items hold critical importance, often characterized by high value or significant market presence, necessitating regular value analysis for optimal management.

Category B: Items in this category are of considerable importance but less so compared to Category A. They represent mid-level inventory values and exhibit moderate market demand.

Category C: Items classified under this category are of minimal significance, accounting for a small proportion of the total inventory value.

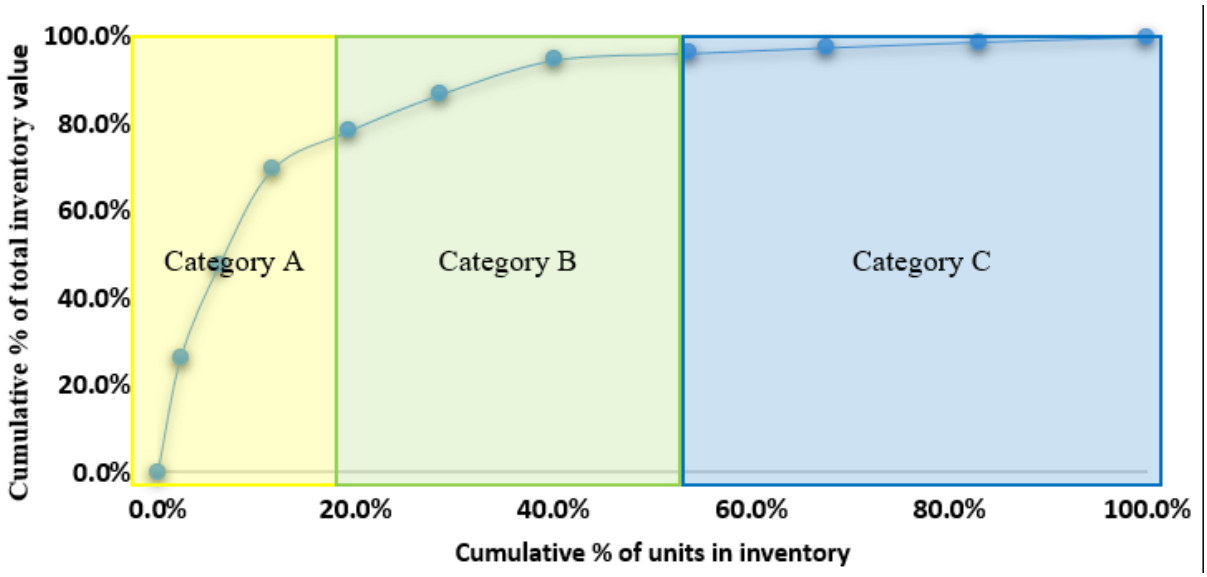

Figure 2- ABC line chart

-ABC Advantages: ABC Analysis contains several benefits for a better inventory management such as:

-Ordering and Safety Stock

-Valuing Stocks.

-Storage Space Organization.

-Frequency of Stock Inventories.

-Size of Storage Spaces.

2. Logistic platforms and cross-ducking:

2.1 Platform definition:

A logistics platform is defined as a strategic location within a territory that serves as a central and complementary element to various modes of transportation. It acts as a crucial link within the network of intermodal freight transport, facilitating the transition between different transportation methods such as rail-road, sea-road, air cargo-road, and their potential combinations. This role is essential for efficient and seamless movement of goods across these modes, thereby enhancing the overall efficiency of the supply chain. Additionally, it ensures a stock duration of 24 hours, allowing for rapid turnover and minimizing storage time to meet just-in-time delivery requirements.

2.2 Platform Types:

2.2.1 Regional Platform:

2.2.1.1 Definition:

A regional platform is a logistics hub located strategically within a specific geographical area to serve the logistics needs of that region. It typically handles the distribution and storage of goods for a defined local market.

2.2.1.2 Role:

It acts as a central point for regional distribution, enabling efficient movement of goods to and from local suppliers, manufacturers, and customers. It often supports last-mile delivery within the region.

2.2.2. Splitting/Bundling platform:

2.2.2.1 Definition: A splitting/bundling platform is a logistics center where large shipments are broken down into smaller units (splitting) or smaller shipments are combined into larger ones (bundling).

2.2.2.2 Role: This type of platform is essential for optimizing transportation efficiency. By splitting large shipments, it facilitates easier handling and distribution. Bundling smaller shipments helps in consolidating loads to maximize transport capacity and reduce costs.

3. Croos-Docking Platform:

3.1. Definition:

A splitting/bundling platform is a logistics center where large shipments are broken down into smaller units (splitting) or smaller shipments are combined into larger ones (bundling). This type of platform is essential for optimizing transportation efficiency. By splitting large shipments, it facilitates easier handling and distribution. Bundling smaller shipments helps in consolidating loads to maximize transport capacity and reduce costs.

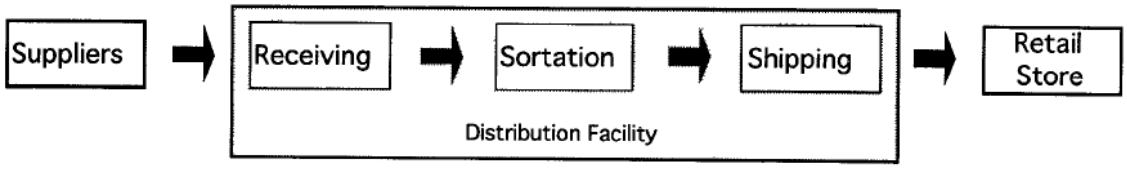

Figure 1: Typical cross docking flow

Figure 3- Cross docking flow

3.2. Cross docking strategy applications:

Several industries utilize cross-docking strategies to optimize their logistics and supply chain operations. Some of the industries that commonly employ cross-docking include:

-Retail: Retailers, especially those dealing with fast-moving consumer goods (FMCG), use cross-docking to quickly transfer merchandise from inbound trucks to outbound trucks for direct delivery to stores. This helps retailers minimize inventory holding costs, reduce stockouts, and improve product availability on shelves.

-Grocery and Food Distribution: Food distribution companies often rely on cross-docking to efficiently manage perishable goods and ensure timely delivery to supermarkets, grocery stores, and restaurants. Cross-docking helps minimize handling of temperature-sensitive products and maintain product freshness throughout the supply chain.

-Automotive: The automotive industry uses cross-docking to streamline the distribution of auto parts and components from suppliers to assembly plants or dealerships. By bypassing warehouse storage, auto manufacturers can reduce lead times, minimize inventory holding costs, and maintain just-in-time inventory levels for production.

-E-commerce and Fulfillment Centers: E-commerce companies leverage cross-docking to expedite order fulfillment and meet customer delivery expectations. By quickly transferring goods from inbound shipments to outbound carriers, e-commerce businesses can reduce order processing times, optimize delivery routes, and improve overall logistics efficiency.

-Healthcare and Pharmaceuticals: Healthcare providers and pharmaceutical companies utilize cross-docking to efficiently distribute medical supplies, equipment, and pharmaceutical products to hospitals, clinics, and pharmacies. Cross-docking helps ensure timely delivery of

critical healthcare supplies, reduce stockouts of essential medications, and optimize inventory management in healthcare facilities.

3.3. The Advantages of cross-docking platforms:

Using a cross-docking platform offers several benefits for businesses looking to optimize their logistics and supply chain operations:

-Reduced Inventory Holding Costs: Cross-docking eliminates the need for storing inventory in warehouses, reducing associated costs such as rent, utilities, and inventory carrying costs. By transferring goods directly from inbound to outbound vehicles, businesses can minimize inventory holding times and free up valuable warehouse space.

-Improved Efficiency: Cross-docking streamlines logistics operations by eliminating unnecessary handling and storage of goods. It accelerates order fulfillment, reduces transit times, and minimizes delays in product delivery. This improves overall operational efficiency and enables businesses to meet tight delivery schedules and customer demands more effectively.

-Lower Transportation Costs: By consolidating shipments and optimizing transportation routes, cross-docking platforms help businesses reduce transportation costs. They minimize empty miles, maximize vehicle utilization, and optimize load capacities, leading to significant cost savings in transportation expenses.

-Enhanced Supply Chain Agility: Cross-docking improves supply chain agility by enabling businesses to respond quickly to changing market conditions and customer demands. It facilitates just-in-time inventory management, reduces lead times, and increases responsiveness to fluctuations in demand, allowing businesses to adapt more effectively to dynamic market environments.

-Improved Inventory Management: Cross-docking platforms provide real-time visibility into inventory levels, location, and movement throughout the supply chain. This enables businesses to better manage inventory, reduce stockouts and overstock situations, and optimize inventory turnover rates. By maintaining optimal inventory levels, businesses can improve cash flow and minimize carrying costs.

-Enhanced Product Quality and Freshness: Cross-docking helps maintain product quality and freshness, particularly for perishable goods and temperature-sensitive products. By minimizing handling and reducing the time between receipt and delivery, businesses can ensure that products reach customers in optimal condition, enhancing customer satisfaction and loyalty.

-Environmental Benefits: Cross-docking contributes to environmental sustainability by reducing the carbon footprint associated with transportation and warehousing activities. By optimizing transportation routes and minimizing empty miles, businesses can lower fuel consumption, greenhouse gas emissions, and overall environmental impact.

4. Introduction to key logistic operation in a logistic platform:

4.1. Definition:

A logistics platform serves as a crucial hub in the supply chain, facilitating the efficient movement, storage, and management of goods. The operations within a logistics platform can be broadly

categorized into three main areas: upstream logistics (logistique amount), downstream logistics (logistique Aval), and internal logistics (logistique interne). Each of these areas plays a vital role in ensuring the smooth and seamless operation of the logistics platform, contributing to the overall efficiency and effectiveness of the supply chain.

4.2 Upstream logistic:

4.2.1 Definition:

Refers to the operations and activities related to receiving and managing inbound goods and materials from suppliers to the logistics platform.

4.2.2 Activities:

-Reception of Goods: Unloading materials from trucks, ships, or railcars.

-Inspection and verification: Checking the quality and quantity of received goods against purchase orders.

-Storage: Placing received goods into designated storage areas within the warehouse.

-Inventory Management: Keeping track of stock levels and managing inventory records for raw materials or components.

-Supplier Coordination: Managing relationships and communications with suppliers to ensure timely deliveries.

-inventory management.

4.3 Internal logistic:

4.3.1 Definition:

Refers to the internal movement, management, and optimization of goods within the logistics platform itself.

4.3.2 Activities:

-Internal transport: Moving goods within the warehouse or logistics facility using forklifts, conveyors, or automated systems.

-Warehouse management: Organizing and maintaining storage systems, ensuring efficient use of space, and maintaining optimal conditions for stored goods.

-Storage: Placing received goods into designated storage areas within the warehouse.

-**Materials Handling:** Handling and managing materials efficiently within the logistics platform, including sorting, consolidating, and deconsolidating goods.

-**Data management:** Monitoring and managing data related to inventory levels, stock movements, and internal processes using warehouse management systems (WMS).

4.4 Downstream logistic:

4.4.1 Definition:

Encompasses the operations related to handling, storing, and distributing outbound goods from the logistics platform to customers or retail locations.

4.4.2 Activities:

-**Order Processing:** Receiving and processing customer orders.

-**Picking and packing**: Selecting items from storage, packaging them for shipment, and labeling.

-**Outbound transportation:** Coordinating the shipment of goods to customers, including route planning and carrier selection.

-**Distribution management:** Ensuring efficient distribution and timely delivery to end customers or retail stores.

-**Customer service:** Handling inquiries and issues related to outbound shipments and deliveries.

5 key traceability techniques in a logistic platform:

5.1. Introduction:

In the intricate web of modern supply chains, logistics platforms serve as pivotal hubs that facilitate the efficient movement and management of goods. Ensuring that these goods are tracked accurately throughout their journey is essential for maintaining transparency, efficiency, and accountability. Traceability techniques are employed to monitor the flow of goods from their origin to their final destination, enabling better control, optimization, and quality assurance. In this context, various advanced technologies and systems are utilized to achieve comprehensive traceability in logistics platforms.

This introduction explores seven key traceability techniques: Barcoding, Radio Frequency Identification (RFID), Global Positioning System (GPS), Blockchain, Enterprise Resource Planning (ERP), Warehouse Management Systems (WMS), and Transportation Management Systems (TMS). Each of these techniques plays a unique role in enhancing the traceability of goods, contributing to the overall efficiency and reliability of the supply chain.

5.2 Traceability in supply chain:

5.2.1. Definition:

Supply chain traceability is defined as the process of tracking the origin and journey of products and their inputs from the beginning of the supply chain through to their end-use. This involves collecting and analyzing data at every stage of the supply chain to ensure that products are produced safely, ethically, and sustainably. The primary goals of supply chain traceability are to enhance transparency and accountability, making it easier for companies to manage risk, reduce waste, and ensure that their products are safe for consumers.

5.2.1.2. The necessary information for traceability operation:

-Product Identification: Unique identifiers for each product or batch, such as serial numbers or barcodes, to track its movement through the supply chain.

-Supplier Information: Details about the suppliers, including names, addresses, contact information, and any certifications they hold. This is crucial for tracing back to the source of a product or ingredient.

-Consumer Information: Data on who purchased the product, including names, addresses, and purchase dates. This information is essential for recalling products if necessary and for understanding consumer behavior.

-Location Tracking: Real-time or near-real-time tracking of the product's location throughout the supply chain, from the moment it leaves the supplier to its arrival at the retailer or consumer.

-Quality and Compliance Data: Information on whether the product meets quality standards and complies with relevant regulations at each stage of the supply chain. This includes test results, inspection reports, and certification documents.

5.3. Tracking in supply chain:

5.3.1. Definition:

Tracking is the process of **observing**, **recording**, and **reporting** the movement of goods, assets, or people from one place to another. It involves the use of technology and systems to monitor the progress of shipments, inventory, and other assets throughout their lifecycle. Tracking provides real-time or near-real-time visibility into the location and status of items, enabling organizations to manage their operations more efficiently and effectively.

5.3.2 The Key Aspects of tracking:

-Location Monitoring: Using GPS or other positioning technologies to determine the exact location of items in transit or in storage.

-Status Updates: Providing updates on the condition and status of items, such as whether they have been delivered, are delayed, or require special attention.

-Historical Data: Keeping records of past movements and statuses, which can be analyzed to improve future operations and predict trends.

-Alerts and Notifications: Sending notifications to relevant parties when items are nearing their destination, have arrived, or encounter delays.

-Integration with Other Systems: Connecting with other supply chain management systems to ensure seamless data exchange and coordination across the supply chain.

5.3.3 Barcoding:

5.3.3.1. Definition:

Barcodes are machine-readable symbols that encode data to support various use cases, such as inventory management, product identification, and data retrieval. They come in two main types: One-Dimensional (1D) and Two-Dimensional (2D) barcodes, each with its own set of symbologist that define the structure and encoding of the data.

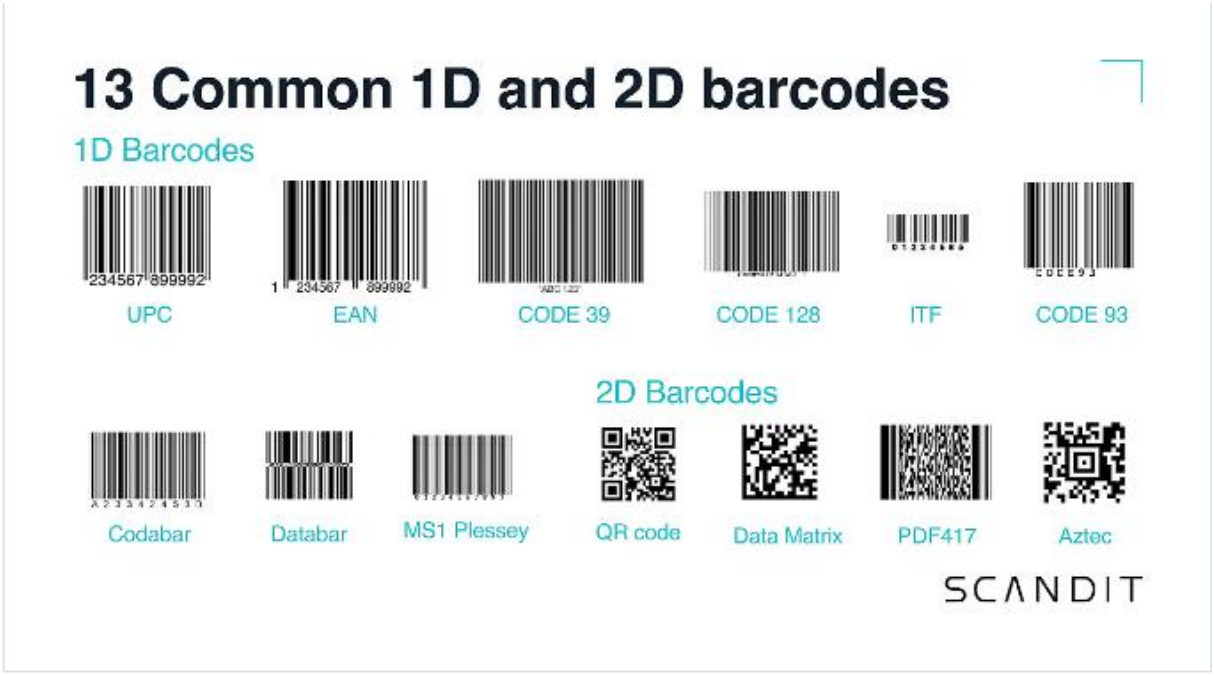

Figure 4- Barcode types

5.3.3.2. One Dimensional (1D) bar code types :

1D barcodes are widely utilized in enterprise operations to streamline inventory workflows and enhance efficiency. These barcodes provide a straightforward and reliable method for encoding data, which can be quickly scanned and interpreted by various devices.

-**Types:** Several types of 1D barcodes are commonly used, including:

-**UPC:** Primarily used for labeling consumer goods in retail environments, especially in the United States.

-**EAN**: Similar to UPC, but primarily used in Europe for point-of-sale scanning of consumer products.

-**Code 39:** Supports both digits and characters, used in various industries such as automotive and defense.

-**ITF (Interleaved 2 of 5):** Often used for labeling packaging materials, especially suitable for printing on corrugated cardboard.

-**Code 93**: An enhanced version of Code 39, offering higher density and security for labeling goods in logistics and retail.

These different types of 1D barcodes provide flexibility and efficiency across various enterprise applications, ensuring accurate and rapid data capture and processing.

5.3.3.3 Two-Dimensional (2D) Barcode Types:

2D barcodes are increasingly used in various industries to store and retrieve extensive amounts of data efficiently. Unlike 1D barcodes, which only encode data in one direction, 2D barcodes can hold more complex information in a compact space, allowing for enhanced data density and error correction.

-**Types**: Several types of 2D barcodes are commonly used, including:

-**QR Code:** Widely used in marketing, retail, and entertainment to link to websites, store information, and track products. Known for its fast readability and high fault tolerance.

-**Data Matrix:** Ideal for labeling small items and electronic components due to its tiny footprint and high data density. Commonly used in logistics and operations.

-**PDF417:** Used for applications requiring large amounts of data, such as photographs, fingerprints, and signatures. Frequently used in logistics, transport, and government-issued documents.

-**Aztec:** Commonly used in the transportation industry, especially for tickets and boarding passes. Notable for its ability to be read even when printed with poor resolution or on mobile devices.

These 2D barcodes offer robust solutions for data storage and retrieval, enhancing operational efficiency and accuracy across diverse applications.

5.3.3.3. The Benefit of Barcode in supply chain:

Barcodes play a crucial role in modern supply chains by significantly enhancing efficiency, accuracy, and transparency. Here are some key benefits of using barcodes in the supply chain:

-Improved Inventory Management: Barcodes facilitate real-time tracking of inventory, enabling companies to maintain accurate stock levels. This helps prevent overstocking and stockouts, ensuring that the right products are available at the right time.

-Enhanced Accuracy: Manual data entry is prone to errors, which can lead to costly mistakes. Barcodes reduce the risk of human error by automating data capture, ensuring that information is recorded accurately and consistently.

-Faster Processing: Scanning barcodes is much faster than manually entering data, speeding up processes such as receiving, picking, packing, and shipping. This increased speed boosts overall operational efficiency and productivity.

-Enhanced Visibility: Barcodes allow for real-time visibility into inventory levels and movements across different stages of the supply chain. This visibility supports better decision-making and helps optimize supply chain operations.

-Streamlined Operations: From manufacturing to distribution, barcodes streamline various supply chain operations by providing a consistent and reliable method for tracking and managing products. This leads to smoother workflows and better coordination among different supply chain partners.

5.3.4. Radio Frequency Identification (RFID):

5.3.4.1. Definition:

RFID (radio frequency identification) is a technology that enables wireless communication through the use of electromagnetic or electrostatic coupling within the radio frequency portion of the electromagnetic spectrum. This technology is utilized to uniquely identify and track objects, animals, or individuals. RFID systems consist of tags, which are small transponders containing a microchip and an antenna, and readers, which emit radio waves and receive signals back from the tags. When a tag passes within range of a reader, it transmits the stored data, allowing for real-time identification and tracking. This process is used in various applications, such as inventory management, pet tracking, access control, and supply chain logistics, providing a reliable and efficient method for automated data collection and identification.

5.3.4.2. Types of RFID tags:

-Active RFID: An active RFID tag has its own power source, often a battery.

Passive RFID: A passive RFID tag receives its power from the reading antenna, whose electromagnetic wave induces a current in the RFID tag's antenna.

5.3.4.3. Types of RFID systems:

-Low-Frequency (LF) RFID Systems:

-Frequency Range: 30 kHz to 500 kHz (typically 125 kHz).

-Read Range: Generally, from a few centimeters to less than 1.8 meters.

-Characteristics: LF RFID systems have a slower data transfer rate compared to higher frequency systems. They are less sensitive to interference from metal and liquids, making them suitable for use in challenging environments.

-Applications: Commonly used in animal tracking (e.g., livestock and pets), access control systems (e.g., key fobs), and industrial automation processes.

-Advantages: Better performance around metallic objects and water, and a reliable choice for short-range, low-speed identification tasks.

2. High-Frequency (HF) RFID Systems:

-Frequency Range: 3 MHz to 30 MHz (typically 13.56 MHz).

Read Range: Typically, from a few centimeters to several meters.

-Characteristics: HF RFID systems have a moderate data transfer rate and can be used for both short and medium-range applications. They are moderately affected by interference from metal and liquids.

-Applications: Widely used in smart cards (e.g., contactless payment cards), library book tracking, ticketing systems, and electronic identification documents.

-Advantages: Suitable for applications requiring moderate speed and range, with the ability to work reasonably well around metallic objects and liquids.

3. Ultra-High Frequency (UHF) RFID Systems:

-Frequency Range: 300 MHz to 960 MHz (typically 433 MHz).

-Read Range: Generally, up to 7.6 meters or more.

-Characteristics: UHF RFID systems offer faster data transfer rates and can read multiple tags simultaneously. However, they are more susceptible to interference from metal and liquids.

-Applications: Ideal for supply chain management, inventory control, asset tracking, vehicle identification, and retail operations where long read ranges and high-speed scanning are essential.

-Advantages: Long read range and high data transfer rate, making them suitable for high-speed and long-range applications.

4. Microwave RFID Systems:

-Frequency Range: 2.45 GHz.

-Read Range: Typically, over 9 meters.

-Characteristics: Microwave RFID systems provide very high data transfer rates and the longest read ranges among RFID systems. They are the most susceptible to interference from environmental factors such as metal and water.

-Applications: Used in toll collection, long-range access control, and certain types of inventory management that require very long read ranges.

-Advantages: Extremely long read range and fast data transfer, suitable for applications where tags need to be read from a considerable distance.

5.3.5. Global Positioning System (GPS):

5.3.5.1. Definition:

GPS (Global Positioning System) tracking is a technology that uses satellite signals to determine the real-time location of objects, individuals, or vehicles. It operates by receiving signals from a network of satellites and calculating the device's position based on the time it takes for the signal to reach the receiver. GPS trackers are widely utilized across various sectors, including supply chain management, for enhancing operational efficiency, safety, and security.

5.3.5.2. GPS application in supply chain:

-Vehicle Tracking: Real-time location monitoring of delivery vehicles.

-Route Optimization: Efficient route planning to reduce travel time and fuel consumption.

-Performance Monitoring: Tracking vehicle performance and driver behavior for better management.

-Real-time Monitoring: Continuous updates on the location of goods and containers.

-Security: Reduces the risk of theft and loss, ensuring the safety of assets.

-Enhanced Transparency: Up-to-date information on the status and location of shipments.

-Improved Coordination: Better coordination between suppliers, manufacturers, and retailers.

-Customer Updates: Providing accurate delivery updates and ETAs to customers.

5.3.6 Block chain technology:

5.3.6.1. Definition:

Blockchain is a decentralized, distributed ledger technology that securely records and verifies transactions across multiple computers. Each transaction is stored in a "block," and these blocks are linked together in a chronological "chain," making the data transparent, immutable, and resistant to tampering. Blockchain relies on cryptographic principles to ensure the integrity and security of the data, enabling trustless interactions among participants.

5.3.6.2. Block Chain application in supply chain:

-Enhanced Transparency: Blockchain technology offers a transparent record of transactions and product movements, fostering trust and accountability among supply chain participants. It provides end-to-end visibility, enabling stakeholders to track products from their origin to final delivery and reducing the risk of disputes.

-Improved Traceability: With blockchain, detailed information about product provenance, origin, and handling can be securely stored and verified. This enhances product traceability, ensuring the authenticity and quality of goods. Additionally, blockchain facilitates efficient recall management by enabling rapid identification and isolation of affected items during recalls.

-Increased Efficiency: Through the use of smart contracts, blockchain automates and streamlines processes such as payments, approvals, and compliance checks. This reduces delays and administrative overhead, while also minimizing errors associated with manual data entry and reconciliation.

-Enhanced Security: Blockchain's immutable ledger ensures tamper-proof records, reducing the risk of fraud and ensuring data integrity. Cryptographic encryption secures data, allowing only authorized parties to access sensitive information, thus enhancing security across the supply chain.

-Cost Reduction: By eliminating intermediaries and streamlining processes, blockchain lowers transaction costs and increases operational efficiency. The transparent and immutable nature of blockchain simplifies auditing processes, reducing the time and cost involved in compliance and regulatory checks.

-Sustainability and Ethical Sourcing: Blockchain verifies sustainable and ethical sourcing practices, providing assurance to consumers regarding product origins and supply chain practices. This builds consumer trust and confidence in the brand while promoting sustainability and ethical business practices.

5.3.6.3. Examples of block chain applications in supply chain:

-Food Safety: Companies like Walmart and IBM have implemented blockchain to track the journey of food products from farms to stores, ensuring food safety and quality.

-Pharmaceuticals: Blockchain helps track and verify the authenticity of pharmaceutical products, combating counterfeit drugs and ensuring patient safety.

-Luxury Goods: Brands use blockchain to authenticate luxury items, preventing counterfeiting and assuring customers of the product’s origin and authenticity.

-Logistics and Shipping: Blockchain enables real-time tracking of shipments, streamlining logistics operations, and reducing the risk of delays and losses.

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5.3.7 Internet of things (IOT) Sensors:

5.3.7.1. Definition:

The Internet of Things (IoT) refers to a network of interconnected physical devices, sensors, actuators, and other objects embedded with software, electronics, and connectivity capabilities that enable them to collect, exchange, and analyze data. IoT enables seamless communication and interaction between devices, allowing them to sense, monitor, and control their environment autonomously or in collaboration with other devices and systems.

5.3.7.2. Applications of IoT in Supply Chain Management:

-Asset Tracking and Monitoring: IoT sensors attached to assets, such as inventory, containers, and vehicles, enable real-time tracking of their location, status, and condition throughout the supply chain. This enhances visibility and enables proactive management of assets, reducing the risk of loss, theft, and damage.

-Inventory Management: IoT devices in warehouses and storage facilities monitor inventory levels, shelf life, and storage conditions. They provide automated alerts for stock replenishment, expiration dates, and temperature-sensitive products, optimizing inventory control and reducing stockouts and overstock situations.

-Predictive Maintenance: IoT sensors embedded in machinery, equipment, and vehicles collect data on performance, usage, and operating conditions. Advanced analytics and predictive algorithms analyze this data to predict potential failures, schedule preventive maintenance, and minimize downtime, ensuring optimal operational efficiency and reliability.

-Supply Chain Visibility: IoT-enabled supply chain monitoring platforms provide real-time visibility into the movement and status of goods, shipments, and vehicles across the entire supply chain. This visibility enables stakeholders to track shipments, identify delays or disruptions, and make informed decisions to optimize logistics operations.

-Cold Chain Management: IoT sensors in refrigerated containers and storage facilities monitor temperature, humidity, and other environmental conditions to ensure the integrity and safety of temperature-sensitive products, such as food, pharmaceuticals, and chemicals, throughout the cold chain.

-Smart Packaging: IoT-enabled smart packaging solutions incorporate sensors and connectivity features to track the location, condition, and authenticity of products during transit. They provide tamper-evident packaging, temperature monitoring, and real-time status updates, enhancing product security and consumer confidence.

-Fleet Management: IoT devices installed in vehicles, trucks, and shipping containers collect data on vehicle location, speed, fuel consumption, and driver behavior. Fleet management systems leverage this data to optimize routing, improve fuel efficiency, enhance driver safety, and reduce transportation costs.

-Environmental Monitoring: IoT sensors monitor environmental factors, such as air quality, humidity, and pollution levels, in warehouses, distribution centers, and transportation facilities. This data helps ensure compliance with regulatory requirements, maintain optimal storage conditions, and mitigate environmental risks.

5.3.8 Enterprise Resource Planning (ERP):

5.3.8.1. Definition:

Enterprise Resource Planning (ERP) systems play a pivotal role in supply chain management by integrating various business processes into a unified platform. This integration facilitates better visibility, control, and optimization of supply chain operations, leading to enhanced efficiency, reduced costs, and improved compliance with regulatory requirements.

5.3.8.2. ERP Applications in supply chain management:

-Streamlined Operations: ERP systems automate and streamline essential business processes, including those related to supply chain management. This automation eliminates the need for manual data entry and updates, saving time and reducing errors 13.

-Improved Visibility and Control: ERP provides comprehensive visibility into supply, demand, capacity, and product flow, allowing businesses to understand their needs and when they need them. It also offers real-time tracking and reporting of various supply chain aspects, ensuring smooth operations and quick identification of issues 5.

-Enhanced Forecasting and Planning: Through demand planning functionalities, ERP systems enable businesses to forecast future consumer needs accurately. This capability supports strategic procurement, manufacturing, order management, warehouse and inventory management, and transportation and distribution, ensuring optimal resource utilization and minimizing lead times 5.

-Cost Control and Efficiency: By consolidating supply chain operations under a single dashboard, ERP systems facilitate more streamlined coordination with suppliers and vendors. This consolidation, combined with automated processes, increases productivity and reduces operational costs 3.

-Collaborative Efforts: ERP systems enhance collaboration between businesses and vendors, facilitating more effective goal alignment and reducing bottlenecks. Suppliers integrated into the ERP system can recognize low inventory levels and ensure resource availability, thereby supporting smoother operations 3.

-Compliance and Financial Management: ERP systems apply strong financial management practices to the supply chain, enhancing cash flow and capital expenditure management. They also optimize logistics and operational processes to maximize efficiency, reduce waste, and improve profit margins.

-Workforce Management and Resource Allocation: ERP systems improve workforce management and resource allocation, ensuring sufficient personnel to meet customer needs. This aspect is crucial for maintaining high service levels and operational efficiency.

5.3.9 Warehouse Management System (WMS):

5.3.9.1. Definition:

A Warehouse Management System (WMS) is a software application or platform designed to manage and optimize the operations of a warehouse or distribution center. WMS facilitates the control and monitoring of various warehouse processes, including receiving, put-away, picking, packing, and shipping of goods. It provides real-time visibility into inventory levels, location tracking, and order fulfillment processes, enabling efficient utilization of warehouse resources, improved inventory accuracy, and enhanced productivity. WMS typically integrates with other supply chain systems, such as Enterprise Resource Planning (ERP) systems and Transportation Management Systems (TMS), to streamline end-to-end logistics operations and support seamless information flow across the supply chain.

5.3.9.2. WMS applications in supply chain and cross docking operations:

-Inventory Management: WMS provides real-time visibility into inventory levels, locations, and movements within the warehouse. It optimizes inventory storage, reduces stockouts and overstock situations, and ensures accurate inventory records. In cross-docking, WMS facilitates the coordination of incoming shipments, **identifying cross-dockable** items for immediate processing.

-Space Utilization: WMS optimizes warehouse layout and storage configurations to maximize space utilization and minimize congestion. It provides insights into storage capacity, SKU dimensions, and storage requirements to optimize warehouse space.

-Order Fulfillment: WMS streamlines order processing, picking, packing, and shipping operations. It assigns tasks to warehouse personnel, optimizes picking routes, **and tracks order progress in real-time**, resulting in faster and more accurate order fulfillment. In cross-docking, WMS consolidates cross-docked items into outbound orders based on customer requirements and shipping destinations.

-Real-Time Visibility: WMS provides real-time visibility into cross-docking operations, including **the status of inbound shipments, staging areas, and outbound orders**. It enables proactive decision-making and exception management to ensure on-time delivery and minimize disruptions.

-Returns Management: WMS manages the processing of returned goods, including inspection, disposition, and restocking. It helps streamline reverse logistics processes, improve customer service, and minimize the impact of returns on inventory levels.

-Performance Monitoring: WMS tracks key performance indicators (KPIs) related to cross-docking operations, such as throughput, dwell times, and order accuracy. It identifies areas for improvement and supports continuous optimization of cross-docking processes.

5.3.10 Transportation Management Platform (TMS):

5.3.10.1. Definition:

A Transportation Management System (TMS) is a software solution designed to optimize and manage the transportation operations of a business or organization. TMS facilitates the planning, execution, and monitoring of shipments, from order creation to delivery, across various modes of transportation such as road, rail, ocean, and air.

Key functionalities of a TMS include route optimization, carrier selection and booking, load planning and consolidation, real-time tracking and visibility, freight audit and payment, compliance management, and performance monitoring and analytics. TMS software helps businesses streamline transportation processes, reduce costs, improve service levels, enhance visibility and control over shipments, and drive operational efficiencies in their logistics operations.

5.3.10.2. TMS application in supply chain:

-Routing and Optimization: TMS software analyzes shipment requirements, carrier rates, and transportation constraints to determine the most cost-effective and efficient routes for shipments. It considers factors such as distance, mode of transportation, delivery deadlines, and carrier capacities to optimize route planning and minimize transportation costs.

-Carrier Selection and Booking: TMS systems provide tools for managing carrier relationships, including rate negotiation, carrier performance monitoring, and carrier selection based on service levels and cost. They automate the process of booking shipments with selected carriers, ensuring compliance with contracts and service agreements.

-Load Planning and Consolidation: TMS software optimizes load planning and consolidation by grouping shipments based on destination, delivery schedules, and capacity constraints. It maximizes trailer utilization, reduces empty miles, and minimizes the number of vehicles required for transportation, resulting in cost savings and reduced environmental impact.

-Real-Time Tracking and Visibility: TMS solutions offer real-time tracking and visibility into shipments throughout the transportation process. They provide status updates, alerts, and exception notifications to stakeholders, enabling proactive management of shipments and timely resolution of issues such as delays or disruptions.

-Freight Audit and Payment: TMS software automates the freight audit and payment process by reconciling carrier invoices with contracted rates, verifying charges, and facilitating payment processing. It helps ensure accuracy in billing, eliminates billing discrepancies, and streamlines the payment process for improved financial management.

-Compliance and Documentation: TMS systems support regulatory compliance by managing transportation documentation, including bills of lading, customs documentation, and hazardous materials paperwork. They ensure adherence to transportation regulations and industry standards, reducing the risk of fines, penalties, and delays in shipments.

-Performance Monitoring and Analytics: TMS solutions provide analytics and reporting tools to monitor transportation performance, track key performance indicators (KPIs), and identify areas for improvement. They generate insights into carrier performance, transit times, on-time delivery rates, and transportation costs, enabling data-driven decision-making and continuous improvement initiatives.

Chapter 2

Shoes Industry.

Chapter 2:

Shoes Industry.

Introduction:

Local industries play a crucial role in the economic growth and prosperity of countries, significantly contributing to the enhancement of individual lifestyles and the overall quality of life. These industries foster job creation, innovation, and economic stability by utilizing local resources and catering to domestic needs. In Algeria, one prominent local industry is the footwear industry. This sector not only supports the livelihoods of many Algerians but also reflects the rich cultural heritage and traditional craftsmanship of the region. The growth and development of the footwear industry in Algeria exemplify how local industries can drive economic progress and improve the standard of living for communities.

The footwear industry plays a pivotal role in the global fashion and lifestyle sectors, offering a blend of functionality, style, and comfort. This chapter presents the various types of footwear and details the shoe manufacturing process. Additionally, it provides insights into the footwear industry in Algeria and explores the opportunities for local industry growth.

1.footwear Industry:

We will talk about the type of shoes, the deferent row material finally the manufacturing process.

1.1. Type of shoes :

Shoes are designed to meet various functional and aesthetic requirements. Here are some primary categories:

1.1.1. Athletic Shoes: Athletic shoes are designed to enhance performance in sports and physical activities. They offer specific features tailored to the needs of different sports.

-Running Shoes: Provide support, cushioning, and stability for running.

-Training Shoes: Versatile for gym workouts and diverse exercises.

-Basketball Shoes: Offer ankle support and grip for court play.

-Soccer Cleats: Feature studs for grip on grass or turf.

1.1.2. Casual Shoes: Casual shoes prioritize comfort and style for everyday wear.

-Sneakers: Everyday comfort shoes with a casual style.

-Loafers: Slip-on shoes with a more formal appearance.

-Boat Shoes: Initially designed for boating, now popular for everyday wear.

1.1.3. Formal Shoes: Formal shoes are designed to complement dressy outfits, offering a polished and professional look.

-Oxfords: Lace-up shoes, often made of leather, for formal occasions.

-Derby Shoes: Similar to Oxfords but with open lacing.

-Brogues: Feature decorative perforations and a more casual look.

1.1.4. Boots: Boots offer durability and protection, extending above the ankle for additional support.

-Ankle Boots: Cover the foot and ankle, suitable for various settings.

-Chelsea Boots: Slip-on ankle boots with elastic side panels.

-Hiking Boots: Durable and supportive for hiking.

1.1.5. Sandals and Slippers: These shoes are designed for comfort and breathability, perfect for warm weather and indoor use.

-Flip-Flops: Simple sandals for casual use.

-Slides: Open-toed sandals with a single strap.

-Dress Sandals: Stylish sandals for formal or semi-formal occasions.

Specialty Shoes: Specialty shoes are designed for specific functions and needs, offering unique features.

-Work Boots: Durable boots designed for heavy-duty tasks, often with safety features.

Designed for comfort and support for individuals with foot problems.

-Orthopedic Shoes: Designed for comfort and support for individuals with foot problems.

1.2. Raw Materials in the Shoe Industry:

The choice of raw materials is critical in the shoe industry as it affects the quality, durability, comfort, and aesthetics of the footwear. Different types of shoes require specific materials to meet their functional and design needs. This section provides an in-depth look at the various raw materials used in shoe manufacturing.

1.2.1. Leather

Leather is a natural material renowned for its durability, comfort, and premium appearance. It comes in various types, each with unique characteristics.

-Full-Grain Leather: This is the highest quality leather, made from the top layer of the hide. It is strong, breathable, and develops a beautiful patina over time. Full-grain leather is used in high-end shoes, including formal and luxury footwear.

-Top-Grain Leather: Slightly lower in quality than full-grain, top-grain leather is sanded and refinished to remove imperfections. It is still durable and often used in mid-range formal and casual shoes.

-Split Leather: Made from the lower layers of the hide, split leather is less durable but more affordable. It is commonly used in less expensive shoes and boots.

-Patent Leather: Known for its glossy finish, patent leather is coated with a plastic layer, making it water-resistant and shiny. It is used in dress shoes and formal footwear.

-Applications:

Leather is versatile and used across various shoe types, from formal shoes like Oxfords and brogues to casual loafers and high-end sneakers. Its breathability and ability to mold to the foot make it a preferred choice for comfort and long-lasting wear.

1.2.2. Synthetic Materials:

Types of Synthetics: Synthetic materials are man-made and offer versatility and affordability. They can mimic the look and feel of natural materials or provide unique properties.

-Polyurethane (PU): PU is a common synthetic leather substitute, offering durability, flexibility, and water resistance. It is used in a wide range of shoes, from athletic to fashion footwear.

-Polyvinyl Chloride (PVC): PVC is used for its durability and low cost. It is less flexible than PU and is often found in cheaper shoe options.

-Nylon and Polyester: These fabrics are lightweight, durable, and quick-drying. They are widely used in athletic shoes, especially in uppers and linings.

-Applications:

Synthetic materials are prevalent in athletic shoes, budget-friendly casual footwear, and fashion-forward designs that require bold colors and patterns. They offer benefits like reduced cost, water resistance, and ease of maintenance.

1.2.3. Rubber

Rubber is essential for shoe soles due to its flexibility, durability, and traction.

-Natural Rubber: Derived from latex, natural rubber is highly elastic and provides excellent grip and cushioning. It is used in high-performance athletic shoes and outdoor footwear.

-Synthetic Rubber: Including variants like Styrene-Butadiene Rubber (SBR) and Ethylene Propylene Diene Monomer (EPDM), synthetic rubber offers similar benefits to natural rubber but with enhanced resistance to wear and environmental conditions.

Applications:

Rubber is primarily used in the outsoles of shoes, including athletic, hiking, and work boots. Its slip-resistant properties make it ideal for safety footwear.

1.2.5. Textiles

Various fabrics are used in shoe manufacturing, each providing unique benefits.

-Cotton: Breathable and comfortable, cotton is commonly used in casual and summer shoes, such as espadrilles and sneakers.

-Wool: Known for its insulating properties, wool is used in winter footwear and specialty outdoor shoes.

-Synthetic Fabrics: Polyester, mesh, and knit fabrics are lightweight and breathable, making them ideal for athletic and casual shoes.

Applications:

Textiles are versatile and used in various parts of the shoe, including uppers, linings, and insoles. They offer comfort, breathability, and style flexibility, making them popular in both casual and performance footwear.

1.2.6. Foam

Foam materials provide cushioning and support in shoes, enhancing comfort and performance.

-EVA (Ethylene-Vinyl Acetate): Lightweight and flexible, EVA foam is widely used in midsoles for its excellent shock absorption and cushioning properties. It is found in athletic shoes, casual footwear, and some dress shoes.

-PU (Polyurethane) Foam: Known for its durability and support, PU foam is used in midsoles and insoles. It offers a good balance of cushioning and stability, making it suitable for athletic and orthopedic shoes.

-Memory Foam: Provides personalized comfort by molding to the shape of the foot. It is used in insoles for casual and comfort-focused footwear.

-Applications:

Foam materials are essential in the construction of midsoles and insoles. They provide the cushioning needed for impact absorption and long-term comfort, particularly in athletic and casual shoes.

1.2.7. Natural Fibers and Sustainable Materials:

With growing awareness of environmental impact, sustainable materials are becoming increasingly popular.

-Cork: Lightweight and resilient, cork is used in footbeds and midsoles for its cushioning and sustainability. It is commonly found in sandals and eco-friendly footwear.

-Hemp: Strong and biodegradable, hemp is used in uppers and linings for casual and eco-friendly shoes.

-Organic Cotton and Bamboo: These materials offer breathability and sustainability, making them suitable for casual and summer shoes.

-Applications:

Sustainable materials are being integrated into various types of footwear, particularly in brands focusing on eco-friendly practices. They offer an environmentally responsible alternative to traditional materials without compromising on quality and comfort.

1.3. The Shoe Manufacturing Process:

The shoe manufacturing process is a complex and multifaceted series of steps that transform raw materials into finished footwear. This process combines traditional craftsmanship with modern technology to produce shoes that meet various functional, aesthetic, and economic requirements. Here, we delve deeper into each stage of shoe manufacturing, from design to finishing.

1.3.1. Design and Development

-Concept and Sketching: The shoe design process begins with conceptualization. Designers create sketches and digital models, considering the latest fashion trends, consumer

preferences, and functional requirements. The initial designs include detailed drawings of the shoe from multiple angles, along with notes on materials and construction methods.

-Prototype Creation: Once a design is finalized, a prototype or sample is made. This stage involves creating a physical model of the shoe to evaluate its aesthetics, fit, and functionality. Designers use various materials, often similar to the final ones, to create the prototype.

-Feedback and Refinement: The prototype is reviewed by a team that includes designers, engineers, and marketers. Based on feedback, the design may undergo several iterations to refine its appearance, comfort, and performance.

1.3.2. Material Selection and Cutting

-Material Sourcing: Quality materials are essential for producing high-quality footwear. Manufacturers source materials such as leather, synthetic fabrics, rubber, foam, and textiles from reliable suppliers. The choice of materials is based on the shoe type, intended use, and price point.

-Pattern Making: Patterns are created for each component of the shoe, including the upper, lining, insole, and outsole. These patterns serve as templates for cutting the materials. Advanced CAD (Computer-Aided Design) software is often used to create precise patterns.

-Cutting: Using the patterns, materials are cut into the required shapes and sizes. This can be done manually or with automated cutting machines for higher efficiency and accuracy. Precision in cutting is crucial to ensure that the pieces fit together correctly during assembly.

1.3.3. Stitching and Assembling the Upper

-Stitching the Upper: The upper part of the shoe, which covers the foot, is assembled by stitching together the cut pieces of material. Skilled workers or automated stitching machines perform this task, ensuring strong and even seams. The upper may include various components, such as the vamp, quarters, and tongue.

-Reinforcements and Linings: Additional materials, such as reinforcements and linings, are added to the upper to enhance its structure and comfort. Reinforcements provide extra strength in high-stress areas, while linings improve comfort and breathability.

-Decorative Elements: Any decorative elements, such as embroidery, logos, or embellishments, are added during this stage. These details contribute to the shoe's aesthetic appeal and brand identity.

1.3.4. Lasting and Shaping

-Creating the Last: A last is a mold that replicates the shape of a foot. It is used to give the shoe its final shape. Lasts are made from wood, plastic, or metal and come in various sizes and shapes to accommodate different shoe styles and foot types.

-Attaching the Upper to the Last: The upper is pulled over the last and secured in place. This process, known as lasting, involves stretching the upper material to fit the contours of the last. It ensures that the shoe takes on the desired shape and fit.

-Toe and Heel Stiffening: Toe caps and heel counters are added to provide additional structure and support. These components help the shoe maintain its shape and protect the foot.

1.3.5. Sole Attachment

-Insole Construction: The insole, which provides cushioning and support, is placed inside the shoe. It is often made from foam, leather, or synthetic materials. Insoles may also include arch supports and other ergonomic features.

-Midsole Assembly: In athletic and performance shoes, a midsole layer is added between the insole and outsole. The midsole is typically made from EVA or PU foam, offering shock absorption and cushioning.

-Outsole Attachment: The outsole is the bottom part of the shoe that comes into contact with the ground. It is usually made from rubber or synthetic materials for durability and traction. The outsole is attached to the upper using adhesive, stitching, or vulcanization, depending on the shoe type and construction method.

1.3.6. Finishing

-Trimming and Cleaning: Excess materials and threads are trimmed, and the shoe is thoroughly cleaned to remove any dust, adhesive residues, or marks. This step ensures that the shoe has a polished and professional appearance.

-Polishing and Buffing: For leather shoes, polishing and buffing are essential to achieve a glossy finish. This process enhances the shoe's aesthetic appeal and provides a layer of protection against moisture and stains.

-Laces and Accessories: Laces, buckles, zippers, and other accessories are added during the finishing stage. These components not only enhance the shoe's functionality but also contribute to its overall design.

1.3.7. Quality Control

-Inspection: Each shoe undergoes a rigorous inspection to ensure it meets quality standards. Inspectors check for defects in materials, stitching, and construction. They also verify that the shoes match the design specifications and fit correctly.

-Testing: Shoes are subjected to various tests to assess their performance, durability, and safety. Tests may include flex testing, abrasion resistance, and slip resistance.

-Packaging: After passing quality control, the shoes are packaged for shipment. Packaging includes placing the shoes in boxes, adding tissue paper or protective materials, and labeling. Proper packaging protects the shoes during transit and enhances the unboxing experience for customers.

1.4. Conclusion:

The shoe manufacturing process is a blend of artistry and engineering, involving multiple stages that require precision, skill, and attention to detail. From the initial design and material selection to the final quality checks and packaging, each step is crucial in creating footwear that meets the desired standards of comfort, durability, and style. As technology and materials science continue to advance, the shoe industry is poised to innovate further, producing shoes that cater to the evolving needs and preferences of consumers worldwide.

2.footwear Market:

in order to obtain a deep understanding to this market it’s necessary to identify the size and growth in addition to products market segmentation to this industry.

2.1 Market Size and Growth:

In Algeria, the revenue in the Footwear market is projected to reach US$879.00m by 2024, with an expected yearly growth rate of 3.30% (CAGR 2024-2028). The Leather Footwear segment will constitute the largest market segment, with a market volume of US$369.20m in 2024. Globally, the United States generates the most revenue in this market, amounting to US$91.51bn in 2024. In terms of per capita revenue, the Footwear market in Algeria is expected to generate US$18.81 in 2024. The market volume is estimated to reach 37.42m pairs by 2028, despite a volume growth rate of -6.4% in 2025. The average volume per person in the Footwear market is projected to be 1.01 pairs in 2024, with 100% of sales attributed to Non-Luxury. Algeria's footwear market is heavily influenced by traditional fashion, with leather and woven fabrics being popular materials. [1]

2.2. Challenges and Opportunities :

-Despite the growth, Algeria imports around 70 million pairs of shoes annually, indicating a need to boost local production and competitiveness. [2]

-Efforts to revitalize the textile-clothing and leather-footwear industries have led to an increase of almost 12% in recent years. [2]

-The government is working towards establishing partnerships with foreign companies, particularly Italian or Turkish, to transfer technology and know-how in the textile sector [2].

-The leather and footwear industry faces challenges due to the dominance of imports, but there is potential for growth and modernization. [2]

3.Benefits of E-commerce for the Local Industry:

The impact of e-commerce on local industries in Algeria has been profound, catalyzed by several factors including the COVID-19 pandemic, the expansion of internet access, and the adoption of digital payment methods.

3.1Growth and Adoption:

-Significant Growth: The e-commerce landscape in Algeria has seen considerable growth, moving from the 109th to the 80th position globally in the UNCTAD rankings, highlighting a rapid advancement in the digital marketplace. [3]

-Transaction Value Increase: The total amount of online transactions surpassed 11.2 billion Algerian dinars in 2021, a significant jump from 5.4 billion in 2020, indicating the expanding role of digital payments in facilitating e-commerce activities. [3]

-Home Delivery Service Flourishing: The home delivery service for online purchases has significantly improved, with companies handling up to 10,000 parcels per day during peak periods, reflecting the growing demand for convenient shopping options. [1]

3.2Market Expansion:

-Increase in E-commerce Websites: The number of Algerian e-commerce websites surged from 48 in 2020 to 105 in the first half of 2021, showing a remarkable growth rate of 118.75%. This expansion indicates a diversification of offerings and competition in the market. [1]

-Prominent Players: Jumia, celebrating its 9th year in Africa in 2021, remains a dominant force in the Algerian e-commerce scene, underscoring the importance of established platforms in driving market growth. [1]

3.3Challenges and Opportunities:

-Legal Framework Needs Revision: Despite the rapid growth, e-commerce in Algeria faces challenges, including the need for revisions and strengthening of the legal framework to better accommodate the digital economy. [1]

-Limited Credit Card Usage: Personal credit card usage is limited in Algeria, with a recent shift towards the use of international credit cards issued by local banks. This presents both a challenge and an opportunity for businesses looking to adopt e-commerce. [4]

4. Strategies for Success:

-Local Partnerships: Collaborating with local businesses, artisans, or suppliers can enhance inventory and strengthen market presence. This approach helps tap into existing customer bases and fosters mutually beneficial relationships. [2]

-Customer Education and Support: Offering support in local languages and educating customers about online shopping benefits, secure payment methods, and service conveniences is crucial. [3]

-Social Media Marketing: Leveraging popular social media platforms like Facebook, Instagram, and WhatsApp to engage with the local community and advertise e-commerce businesses effectively. [3]

General Conclusion:

In this chapter, we have explored various aspects of the shoe industry, encompassing product types, raw materials, and the manufacturing process. Furthermore, we delved into the footwear market share in Algeria, highlighting opportunities for growth. Additionally, we discussed the transformative potential of e-commerce, emphasizing how strategic services and effective marketing strategies can catalyze advancements in the local footwear industry.

Chapter 3

Information systems and ERPs.

Chapter 3:

Information system and ERPs.

Introduction:

In the business market companies are seeking for obtain the best technologies in order to streamline their working process and increase efficiency in order to maximize profitability and increase market share. Therefore, it is essential to have the suitable information system that integrates all the business process, coordinate tasks and operations and increase collaborations and communication between department and teams.

Among these systems, Enterprise Resource Planning (ERP) is tool that offers an integration of information technology suitable for business logic. ERP software provide shared database and that allows departments and teams to coordinate tasks, ERP programs can even automate numerous activities.

The importance of ERP lies in the ability to centralize and the business data base and share real-time information. This seamless integration ensures that decision-makers accurate and up-date data, enabling them to make informed decisions.

The role of ERP cannot be overstated, it provides a clear of the company business structure by grouping all key departments such as purchasing, sales, finance, logistic and product in a single platform this allows to identify and plan the resource needed across the organization to meet customer demands in terms of recipes, production and delivery, offering quality, appropriate pricing, and timelines.

In conclusion ERPs serves a comprehensive information system that offer an overview of the business situation and performance, their characteristics and advantages make theme a vital technology for efficient management and strategic planning.

1.Information System:

1.1 definition:

An information system is a collection of resources (hardware, software, data, procedures, humans, etc.) structured to acquire, process, store, transmit, and make information available (in the form of data, text, sound, images, etc.) within and between organizations.

1.2 The functions of information system:

1.2.1 data collection:

-Information systems gather raw data from various sources, including manual input, digital devices, sensors, and external databases.

-Data collection processes may involve capturing data at the point of origin, such as through barcode scanners, RFID readers, or online forms.

-The collected data can include structured data (e.g., transaction records, customer details) and unstructured data (e.g., emails, social media posts).

1.2.2 data Processing:

-Once the data is collected, raw data undergoes processing to transform it into usable information.

1.2.3 data Storage:

-Processed data is stored in databases, file systems, or other storage mediums to ensure accessibility and persistence.

-Information systems employ various storage technologies, such as relational databases, data warehouses, cloud storage, and distributed file systems.

1.2.4 Information Retrieval:

-Information systems facilitate the retrieval of stored data and information in response to queries or requests from users or other systems.

-Retrieval mechanisms include search algorithms, database queries, and indexing techniques to quickly locate relevant information.

-User interfaces and applications provide intuitive ways for users to retrieve and access information based on their needs and preferences.

2.ERP (Enterprise Resource Planning):

2.1 Definition

Enterprise Resource Planning (ERP) is a type of software that organizations use to manage and integrate their core business processes. These processes include accounting, procurement, project management, risk management and compliance, supply chain operations, and more. ERP systems aim to streamline operations by providing a single source of truth for an organization's data, eliminating data duplication, and facilitating the flow of information across various departments. This integration allows for better decision-making, improved productivity, and enhanced efficiency across the entire organization.

ERP systems come in different forms, including on-premises, cloud-based, and hybrid models. On-premises ERP systems are hosted on a company's own servers, while cloud-based ERP systems operate on remote servers managed by a third party. Hybrid ERP combines elements of both, offering flexibility depending on the organization's needs.

Examples of ERP systems include industry-specific solutions that cater to the unique requirements of certain business types, offering specialized functionalities like materials planning and manufacturing record management. These tailored systems reduce the need for extensive customization or integration with other tools.

Despite its benefits, implementing an ERP system can present challenges, including high initial costs, extensive customization difficulties, and the need for significant changes to business processes. Additionally, overcoming resistance to change within the organization and addressing concerns around data security and privacy can be complex.

In summary, ERP is crucial for managing and optimizing business operations across various sectors, offering a unified platform for managing finances, supply chains, operations, and more. Its implementation, however, requires careful consideration of the organization's specific needs and potential challenges.

Figure 5- ERP services

2.2 ERP types:

2.2.1 By Industry:

-**Manufacturing:** ERP systems such as Infor Cloud Suite, Microsoft Dynamics AX, Oracle JD Edwards, and QAD are tailored for manufacturing operations. These systems streamline end-to-end processes to enhance customer service, improve production quality, and leverage data for effective planning.

-**Retail**: Retail-specific ERP systems are designed to manage resources, timesheets, and expenses with features tailored to the unique needs of the retail sector.

-**Professional Services**: ERP systems for professional services firms address unique challenges such as billing, project management, and client relationship management.

-**Construction**: ERP systems for construction companies focus on managing project timelines, budgeting, and resource allocation.

-**Wholesale Distribution**: ERP systems tailored for wholesale distributors optimize supply chain operations and inventory tracking, focusing on logistics and inventory management needs.

2.2.2 By Company Size:

-**Small Business:** ERP systems for small businesses prioritize ease of use and affordability, offering scalable solutions that grow with the company.

-**Mid-Sized Companies:** ERP systems for mid-sized companies balance functionality with cost-effectiveness, providing robust features without overwhelming the organization.

-**Fast-Growing Companies:** ERP systems for fast-growing companies emphasize scalability and flexibility to adapt to rapid business changes.

-**Large Enterprises:** Solutions like Oracle ERP Cloud, Oracle JD Edwards, and SAP's All-in-One and HANA systems are designed to manage the complexity and high transaction volumes typical of large businesses, offering real-time visibility and advanced analytics capabilities.

2.2.3 Deployment Method:

-**On-Premise:** Traditional ERP systems where the software is installed and maintained on the company's own servers.

-**Cloud-Based:** Modern ERP systems that run on remote servers accessed via the internet, offering scalability and reduced maintenance requirements.

-**Hybrid**: A combination of on-premise and cloud-based deployments, allowing for flexibility in how and where data is stored and processed.

2.3. ERP advantages:

Enterprise Resource Planning (ERP) systems offer numerous advantages that can significantly enhance a company's efficiency, productivity, and overall business operations. Here are some key benefits of implementing an ERP system:

-Improved Efficiency: ERP systems streamline and automate business processes, reducing the time and effort required to complete routine tasks. This leads to increased operational efficiency and productivity.

-Integrated Information: ERP systems centralize data across all departments, ensuring that all business units have access to the same, up-to-date information. This eliminates data silos and improves communication and collaboration within the organization.

-Enhanced Reporting and Planning: ERP systems provide robust reporting tools and analytics, enabling better planning and decision-making. Businesses can generate real-time reports and insights, which help in monitoring performance and identifying areas for improvement.

-Scalability: ERP systems are designed to grow with the business. They can be scaled up to accommodate new users, locations, and business processes, making them suitable for growing enterprises.

-Data Accuracy and Consistency: By consolidating data entry and reducing manual processes, ERP systems minimize errors and ensure data accuracy and consistency across the organization. This leads to more reliable data for decision-making.

-Improved Customer Service: With access to comprehensive customer information, businesses can improve their customer service. ERP systems help manage customer relationships more effectively, leading to higher customer satisfaction and retention.

-Streamlined Supply Chain Management: ERP systems provide tools for managing and optimizing the supply chain. This includes inventory management, procurement, order processing, and logistics, resulting in better coordination and reduced lead times.

-Better Collaboration: By providing a unified platform for information and processes, ERP systems facilitate better collaboration among employees and departments. This improves coordination and helps achieve business objectives more efficiently.

-Business Intelligence: ERP systems incorporate business intelligence (BI) tools that enable businesses to analyze data, identify trends, and make informed decisions. This leads to more strategic planning and better overall performance.

-Mobility and Remote Access: Many modern ERP systems offer mobile access, allowing employees to work from anywhere. This flexibility supports remote work and ensures that business operations can continue uninterrupted.

3. Key Technologies in My ERP System.

3.1. Introduction:

In the realm of wholesale distribution, where efficiency and precision are paramount, implementing a robust ERP system is essential for optimizing logistics and inventory management. Our ERP project focuses on creating a sophisticated cross-docking platform designed to streamline the entire supply chain process for wholesale distributors. Cross-docking, a practice that involves unloading materials from incoming shipments and loading them onto outbound trucks, significantly reduces storage costs and improves delivery times. To support this advanced logistical approach, our ERP system integrates cutting-edge technologies, ensuring seamless operations and scalability to accommodate the rapid growth of our company.

3.2. Industry Focus (Wholesale Distribution):

Our ERP system is specifically tailored to address the logistics and inventory management needs of wholesale distributors. By optimizing supply chain operations and inventory tracking, the system helps maintain a competitive edge in a demanding market. Key features include real-time inventory tracking, demand forecasting, vendor management, and comprehensive order management.

Figure 6- Wholesale distribution center.

3.3. Company Size (Fast-Growing Company):

As a fast-growing company, scalability and flexibility are crucial. Our ERP system is designed to handle increasing data volumes and user loads while maintaining high performance. Its modular architecture allows for the easy addition of new functionalities as the company expands, ensuring that the system evolves alongside the business.

3.4. Deployment Method (Cloud-Based):

A cloud-based deployment method offers numerous advantages, including lower upfront costs, enhanced accessibility, automatic updates, and scalability. Users can access the ERP system from anywhere, at any time, using any device with internet connectivity, facilitating remote work and collaboration.

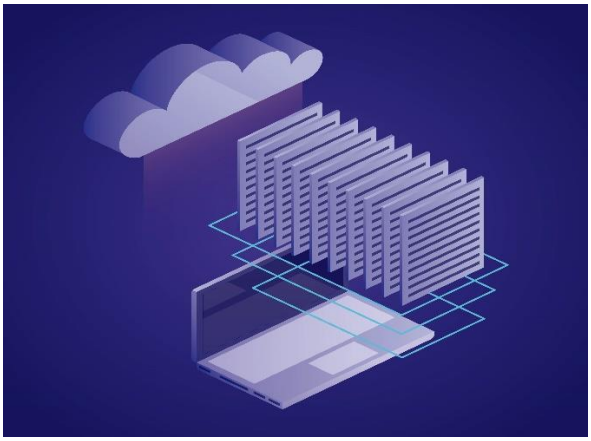

Figure 7- Cloud deployment illustration

3.5. Technology Stack:

To build a robust, user-friendly, and efficient ERP system, we have chosen the following technology stack:

-Django: A high-level Python web framework that encourages rapid development and clean, pragmatic design. Known for its robustness, scalability, and security features, Django handles everything from the database to the final output, making it an ideal choice for backend development in our ERP system.

Figure 8- Django framework logo

-Frontend (HTML, CSS, JavaScript, TailwindCSS, Flowbite):

-HTML: The standard markup language used to create the structure of web pages.

-CSS: Used for describing the presentation of web pages, ensuring a visually appealing and responsive design.

-**JavaScript**: A programming language that enables interactive web pages and enhances user experience.

Figure 9- HTML CSS JavaScript logos

-**TailwindCSS**: A utility-first CSS framework that allows for rapid UI development without leaving the HTML. It ensures consistency and efficiency in styling with built-in responsive design capabilities.

Figure 10- Tailwindcss logo

-**Flowbite**: A component library built on TailwindCSS that provides pre-designed components, such as buttons, forms, and modals, to speed up the development process.

Figure 11- Flowbite logo

Conclusion

Our ERP project leverages a powerful combination of modern technologies **to support a sophisticated cross-docking platform**. By utilizing Django for the backend and a combination of HTML, CSS, JavaScript, Tailwinds, and Flow bite for the frontend, we ensure that the system is robust, scalable, and user-friendly. **The cloud-based deployment method further enhances accessibility, scalability, and cost-effectiveness**, making it an ideal solution for a fast-growing company in the wholesale distribution industry. This integrated approach not **only optimizes logistics and inventory management** but also **supports the strategic goals of the organization, driving efficiency and growth in a competitive market.**

Chapter 4

Application case.

Chapter 4:

Application Case.

Introduction:

With the demographic growth and the increase of people consumption of goods the Wholesale distribution industry is in constant revolution. This rapid expansion leads us to the growth and complexity of process, Making the necessity of a software to streamline the workflow of the business in order to increase customer satisfaction and enhance the market share.

ERP integrate all business process and tasks by centralizing the database a cross all department and operation, which improve communication and collaboration a cross the work units, furthermore the software can provide business intelligence dashboard and reporting which provide a global insight a bout business situation leads to better decision making, in addition Enterprise resource planning can access and manage customers information which helps manage customer management more accurately in order to achieve customer satisfaction and market growth.

My ERP system provides a comprehensive solution tailored to the wholesale industry, integrating essential activities and features to optimize operations. Key modules include inventory management, transportation management, order traceability, and product tracking. Additionally, the system features advanced BI dashboards for real-time data analysis and decision-making. These integrated modules and features significantly improve supply chain processes, enhance operational efficiency, and ensure faster delivery times, ultimately leading to higher customer satisfaction.

1.Conception:

1.1. Use Case Diagram:

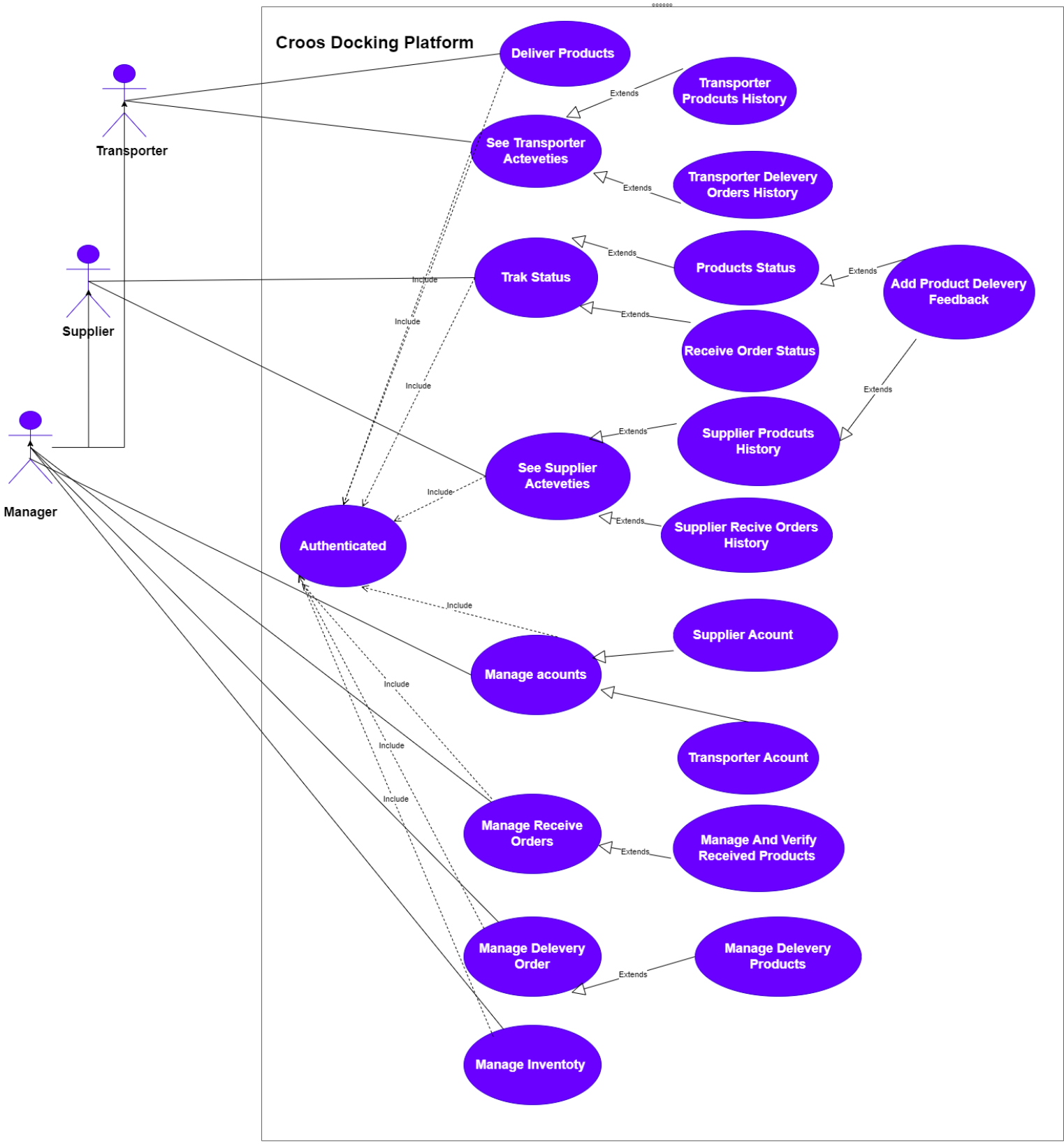

Figure 12- Croos docking platform use case diagram

Diagram description:

-Transporter:

The Transporter is responsible to deliver suppliers products that are listed in the delivery orders assigned to him

-Operational tasks:

-Access and review all delivery orders assigned to him.

-Submit product delivery confirmations.

-View the history of all deliveries and products handled to him, in order to provide a clear record of his activities and performance.

-Supplier:

The supplier user is responsible for managing the supply of products and ensuring their timely receipt by the platform.

-Operational tasks:

-Monitor the delivery products to the platforms.

-Track receive order status and products status and view details of each products they supply including its status, delivery location, and associated receive.

-Provide feedback on product delivery.

-Access to the history of all receive orders related to him, and products in order to provide a global insight of his activities with the platform.

-Manager user: The Manager is the supervisor of all business operation ensuring smooth and efficient functioning, create account, transporter or supplier, create and track orders (receive and delivery orders) and manage inventory, trace orders, product and transporter history and information in order to get the business overview.

-Role:

-create and manage transporters and suppliers accounts.

-create and track receive and delivery orders, ensuring their fulfillment.

-Oversee inventory, including the organization and tracking of products within the inventory blocks.

- Oversee inventory management, including the organization and tracking of products within the inventory blocks

-track the history and status of all orders, products, suppliers and transporters to maintain an overview of the business operations.

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1.2. Class Diagram:

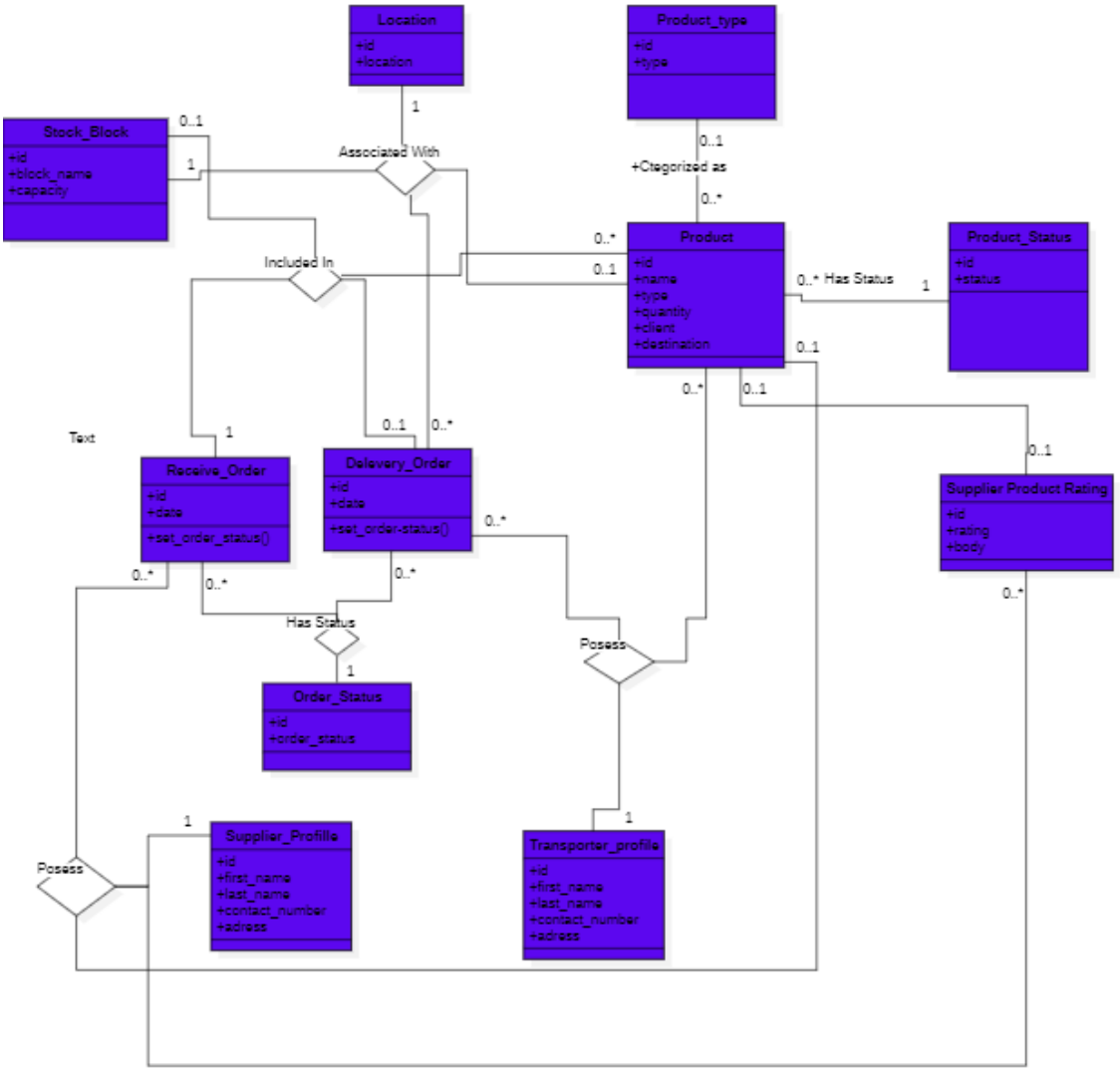

Figure 13- Class diagram

Description:

Class Diagram Description:

This class diagram has been developed to represent the business logic and process operations of our shoes wholesale distribution platform. It encapsulates the relationships and interactions between different entities within the system:

-Product Management:

Product: Each product belongs to a specific type (e.g., shoes, sneakers) and is tracked with a status to ensure accurate information. A product is associated with a category, color, and a quantity. It is linked to a location (state), stored in a specific block in the inventory, and belongs to a supplier. Additionally, a product is part of one receive order and one delivery order.

Product_Type Product_Status: These models define the various types, categories, colors, and statuses a product can have.

-Order Management:

Receive_Order: Represents an order received from a supplier, including the date and delivery date. Each receive order has a status and is linked to multiple products and a supplier.

Delevery_Order: Represents an order for delivering products to a specific location. It includes dates, delivery location, status, and is handled by a transporter. It is associated with multiple products.

-Location and Inventory Management:

Location: Represents a delivery or receive location (City).

Block: Represents a storage block in the inventory, each associated with a specific location and having a capacity.

-User Management:

Supplier_Profile: Contains information about suppliers, including contact details and associated user account.

Transporter_Profile: Contains information about transporters, including contact details, associated user account, and assigned location.

Marketing and Feedback:

SupplierProductRating: Enables suppliers to rate products and leave feedback, including ratings from 1 to 5.

-Relationships and Constraints:

-A product is linked to one receive order, one delivery order, and one supplier.

-A supplier can have multiple receive orders and products.

-A transporter is responsible for delivering products listed in the delivery order assigned to them.

-Each block in the inventory is designated for a specific delivery location.

1.3. Sequence Diagram:

1.3.1. Authentication sequence diagram:

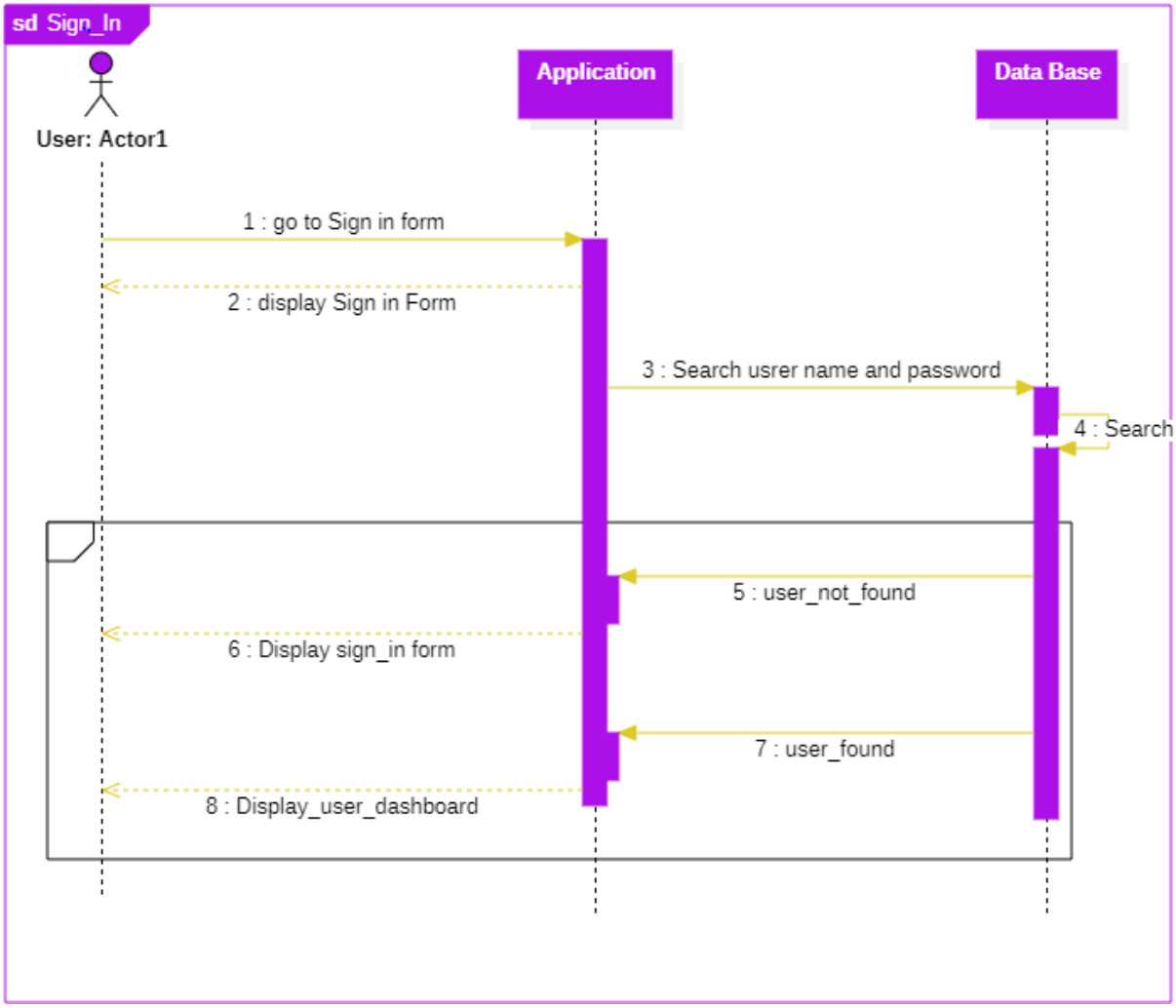

Figure 14- Authentication sequence diagram

1.3.2. Order Creation sequence diagram:

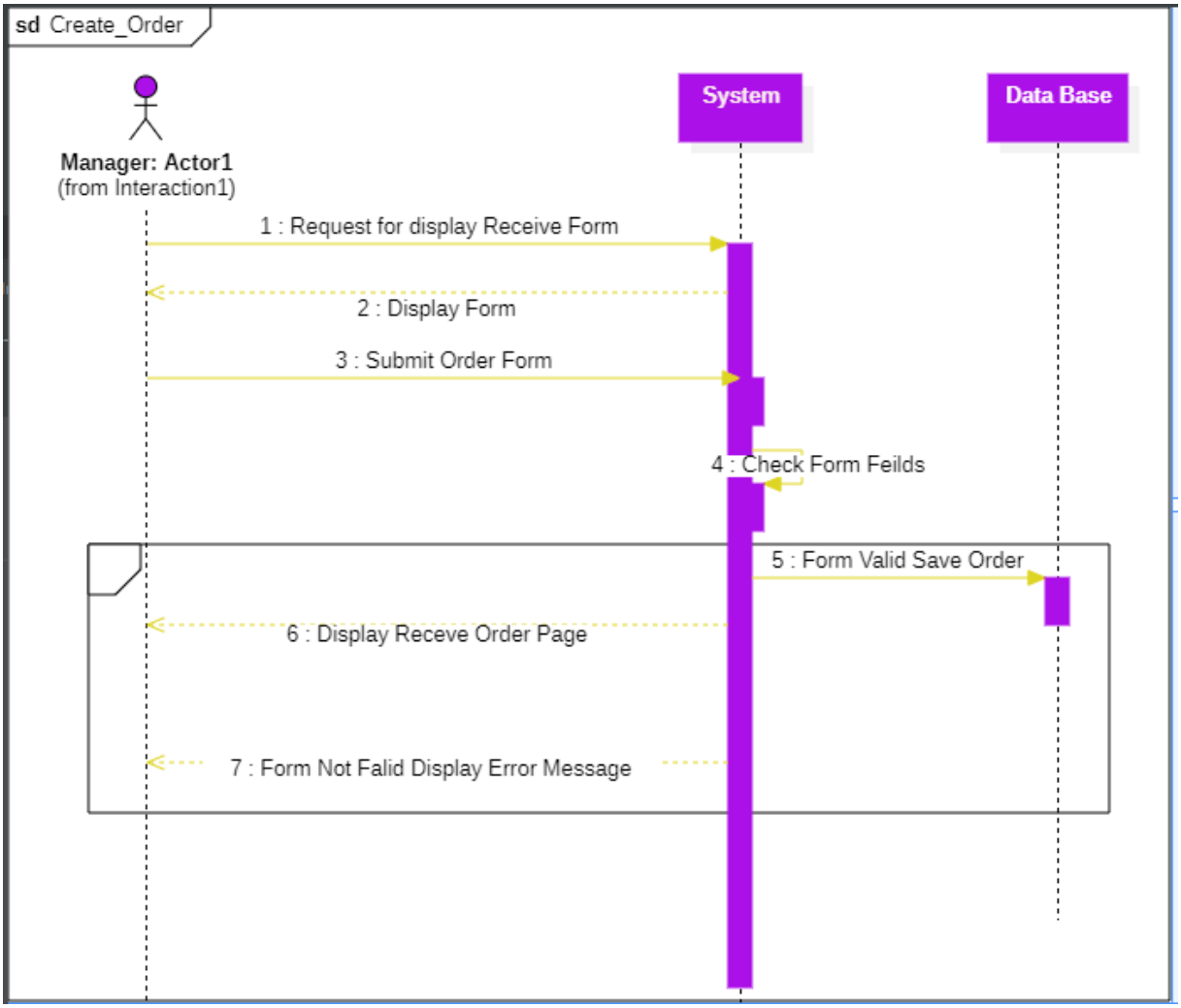

Figure 15- Order Creation Sequence diagram

1.3.3. Add Product to Receive Order sequence diagram:

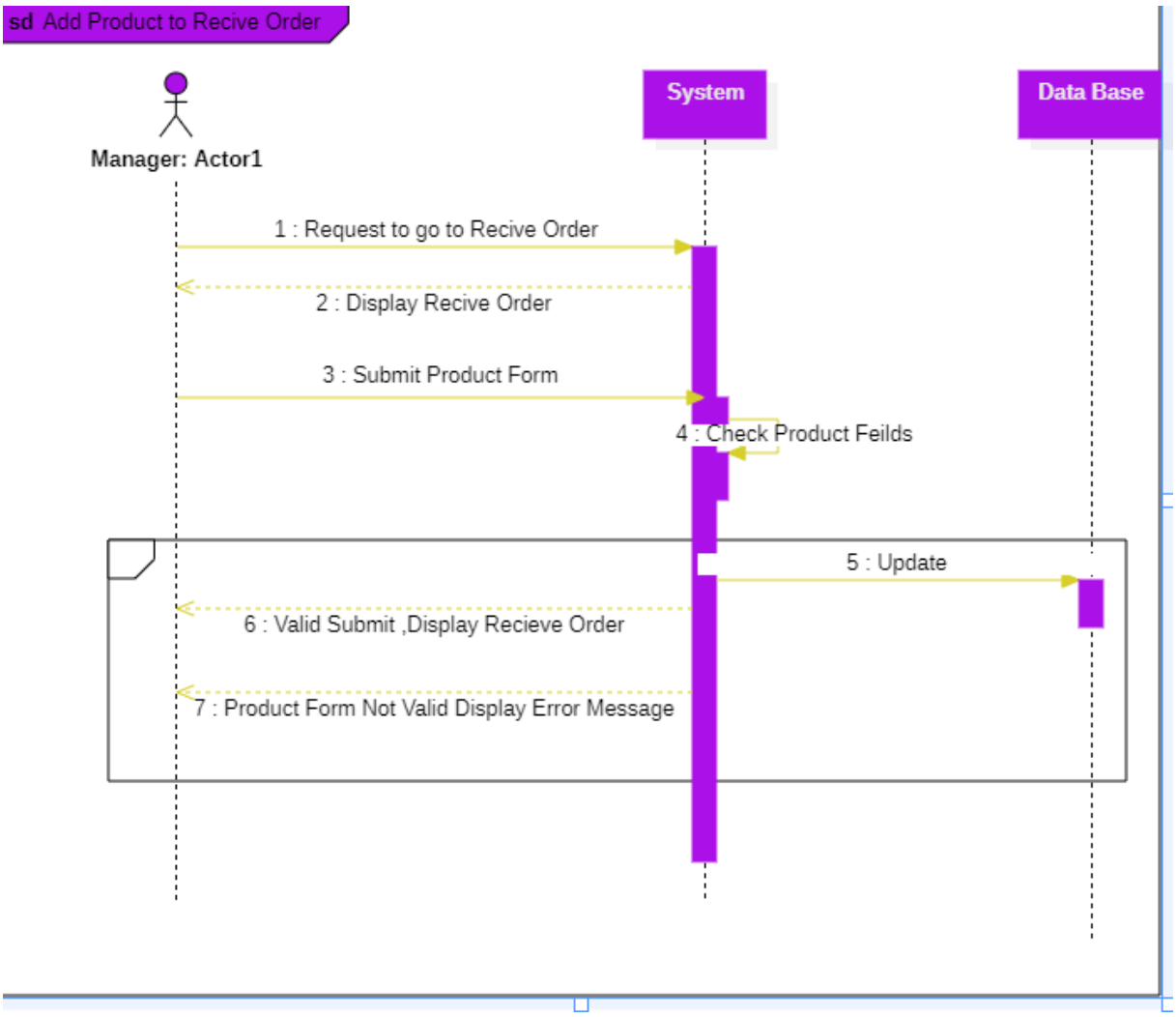

Figure 16- Add Product to Receive Order Sequence diagram

1.3.4. Add Product to Delivery Order sequence diagram:

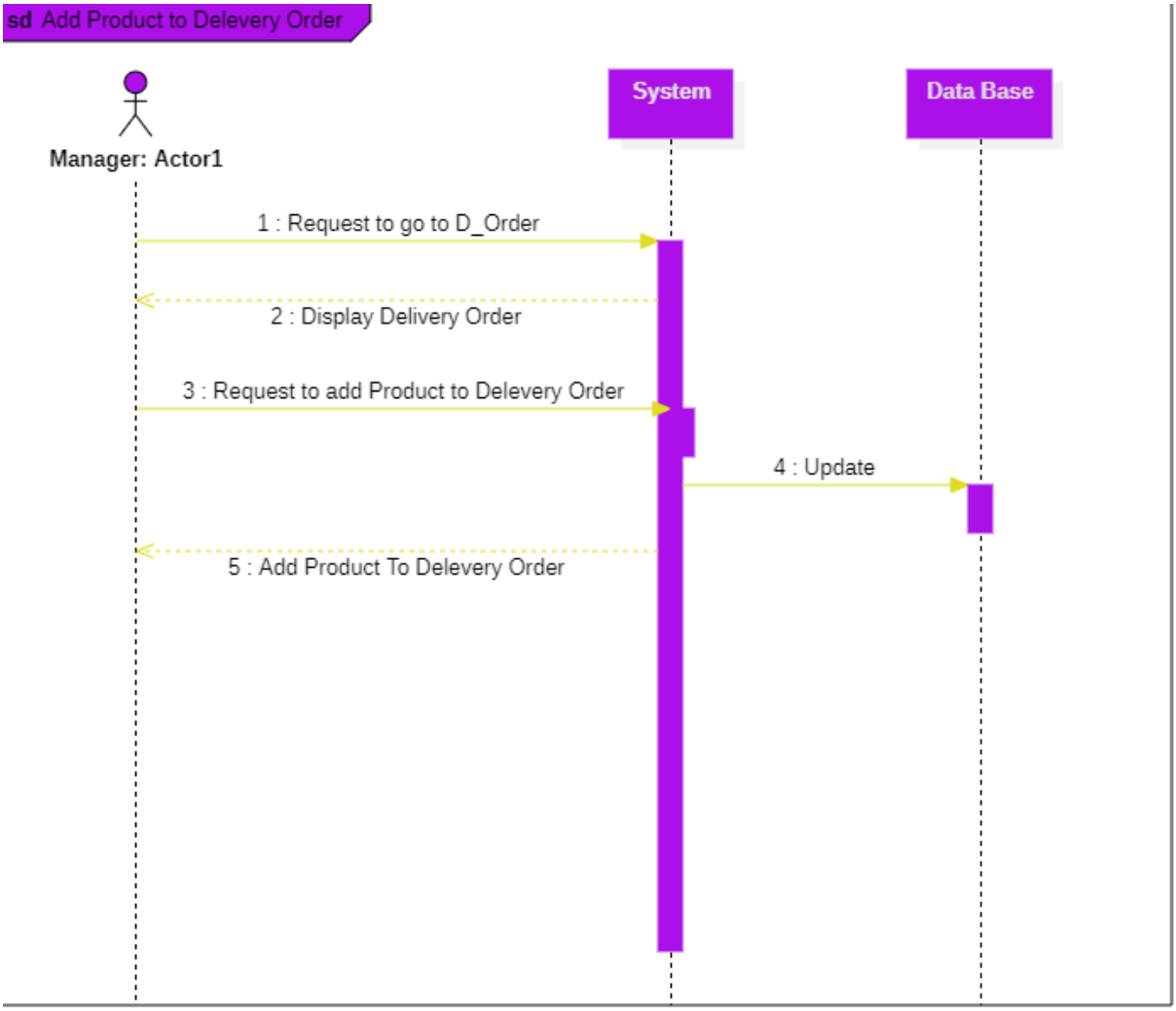

Figure 17- Add Product to Delivery Order sequence diagram

Conclusion:

During the conception phase of our project, we developed use case diagrams and sequence diagrams to outline and understand the system's functionality and interactions. The use case diagrams identified user interactions and system functions, ensuring comprehensive coverage of requirements. Sequence diagrams detailed the flow of interactions between system components, helping optimize design and identify potential issues. These diagrams provide a solid foundation for the development phase, ensuring clear guidance and a better chance for successful project implementation.

2.Development:

This section illustrates the app development process. After building the architecture of the app system using use case diagrams, class diagrams, and sequence diagrams, we introduce the working environment and the app interfaces for our project.

2.1 Django Environment:

2.1.1. Django Project:

is a collection of settings for an instance of Django, including database configuration, Django-specific options, and application-specific settings.

2.1.1.1. Project Creation:

we create the Django project first by installing Django internment then installing a project all this process is done using cmd commands:

```
pip install django
```

Figure 18- Django installation cmd command

```
django-admin startproject Graduation
```

Figure 19- Django project starting cmd command

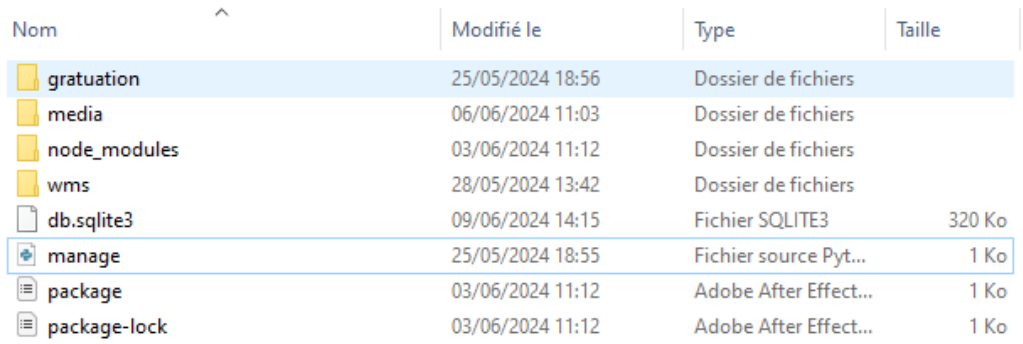

Figure 20- Django project

-manage.py: A command-line utility that lets you interact with your Django project.

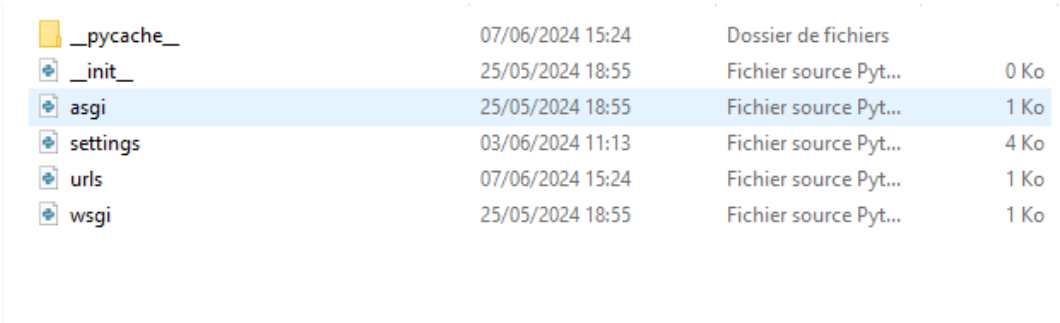

Figure 21- Django project folder

__init__.py: A command-line utility that lets you interact with your Django project.

-settings.py: Contains all the settings/configuration for the project (database settings, installed apps, middleware, etc.).

-urls.py: The URL declarations for the project; a "table of contents" of your Django-powered site.

2.1.1.2. Create an Application:

Within the project create a new Django application using cmd command, for example named 'wms':

```
python manage.py startapp wms
```

Figure 22- Django Starting app cmd command

-Application Folder Structure: the project structure will now include the new 'wms' application:

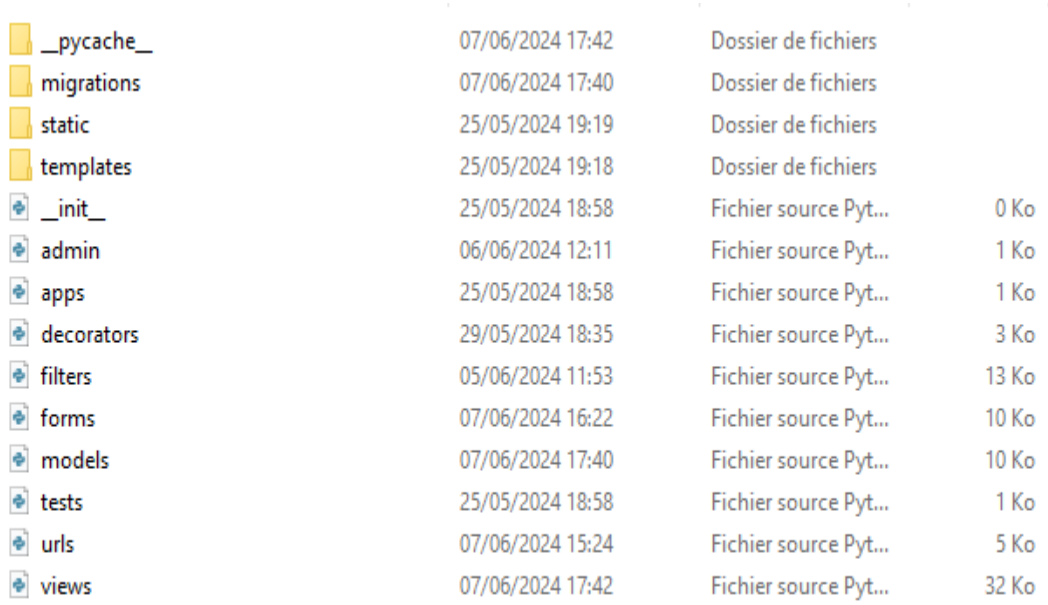

Figure 23- Django app folder

-**models.py**: Defines database models and schema.

-**admin.py**: Registers models to be managed through the Django admin interface.

-**urls.py**: Maps URLs to views within the application.

-**views.py**: Contains view functions or classes that handle web requests.

-**forms.py**: Contains form classes for handling user input.

-**filters.py**: Defines custom template filters.

-**templates/**: Holds HTML templates for rendering dynamic content.

-**static/**: Contains static files like CSS, JavaScript, and images.

-**init.py**: Marks the directory as a Python package.

-**apps.py**: Contains the application configuration.

-**tests.py**: Contains test cases for the application.

3.Presentation:

3.1 Manager Interfaces:

3.1.1 Purchase Orders:

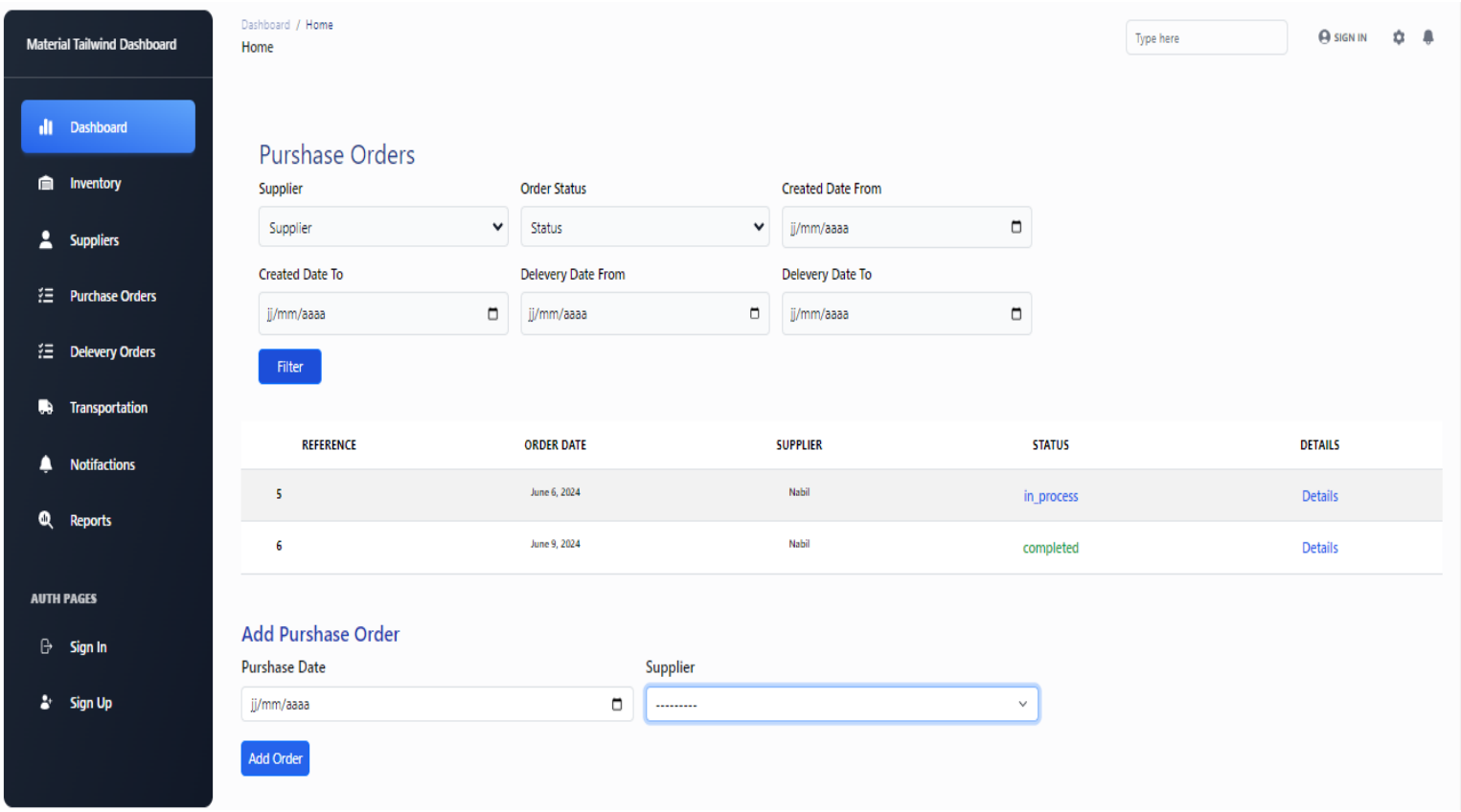

Figure 24- Receive order dashboard

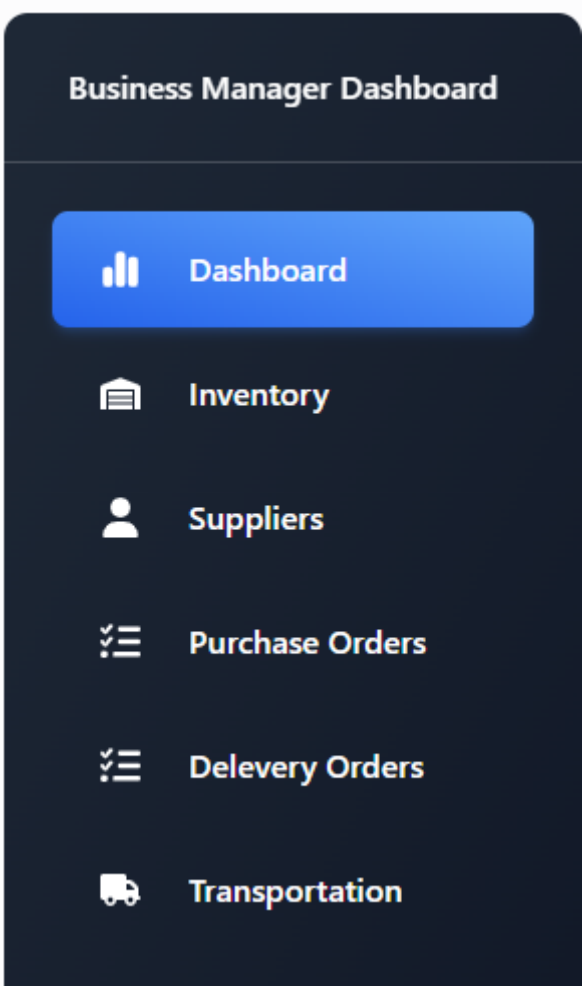

Figure 25- Side menu

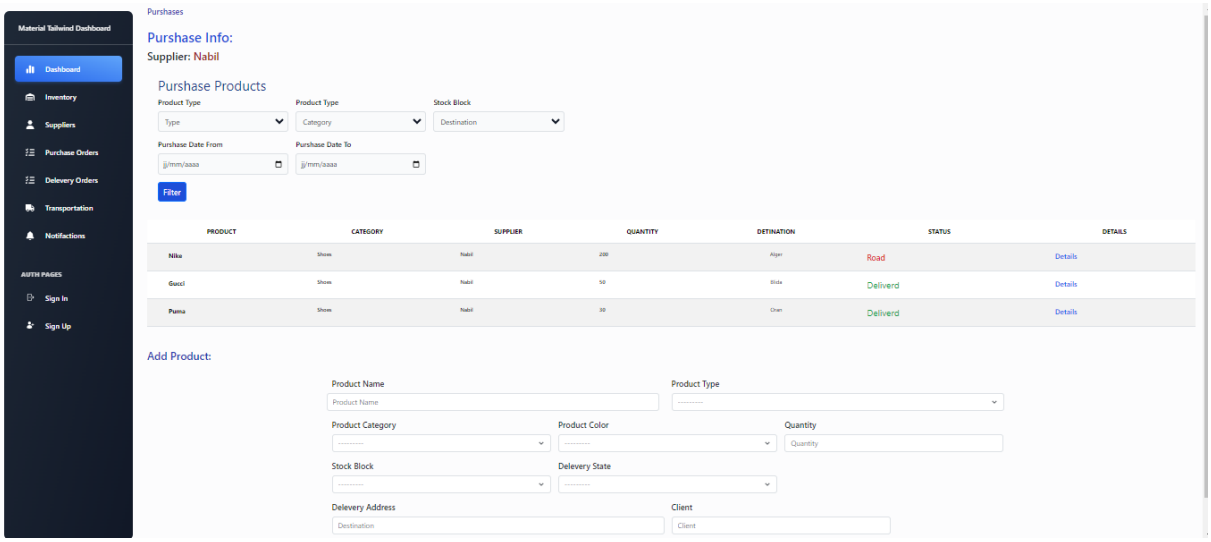

Figure 26- Receive order dashboard

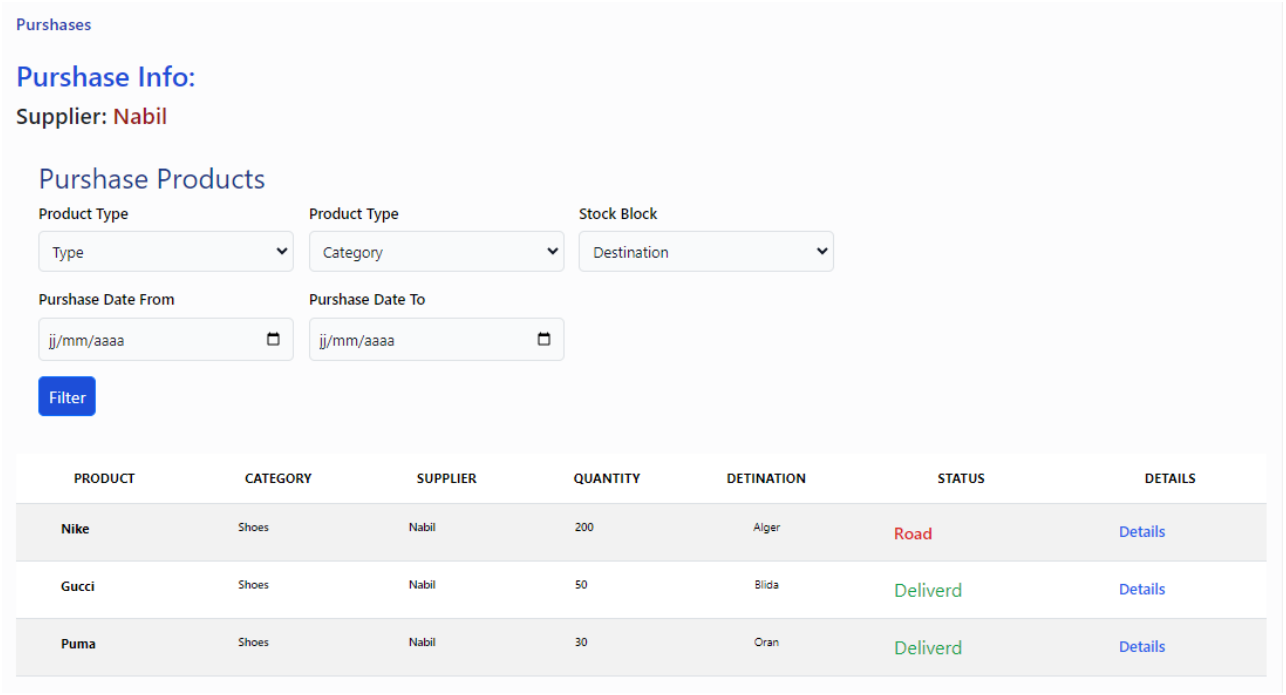

Figure 27- Receive Order Details Part

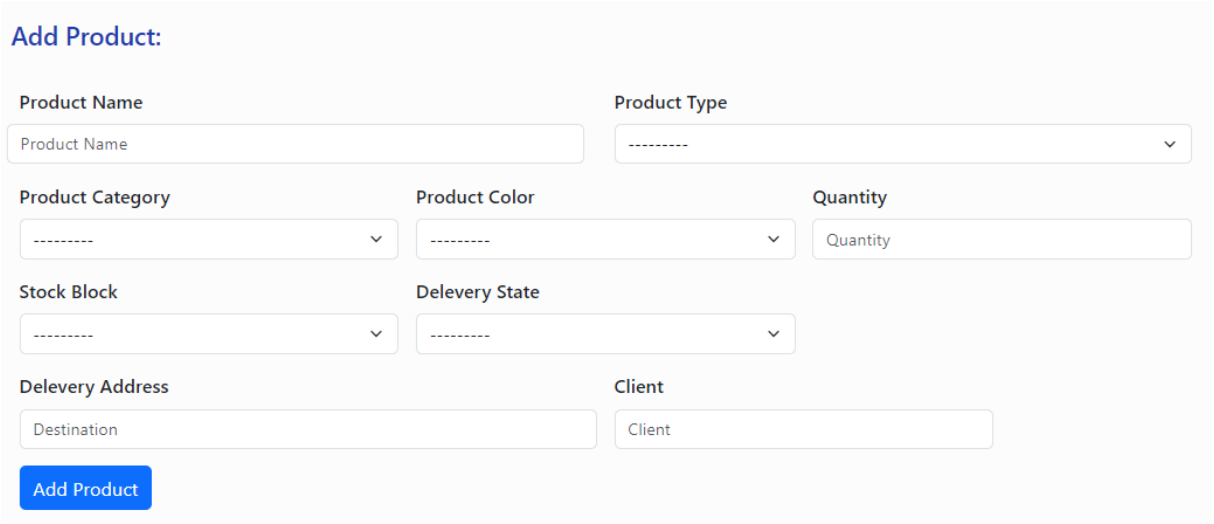

Figure 28- Add Product to Receive Order Part

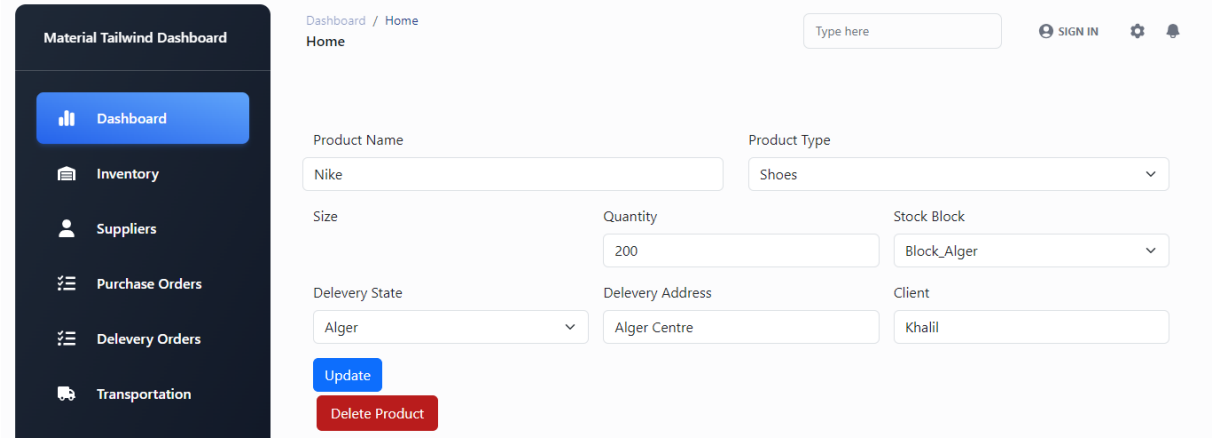

Figure 29- Product Details

3.1.2 Inventory Dashboard:

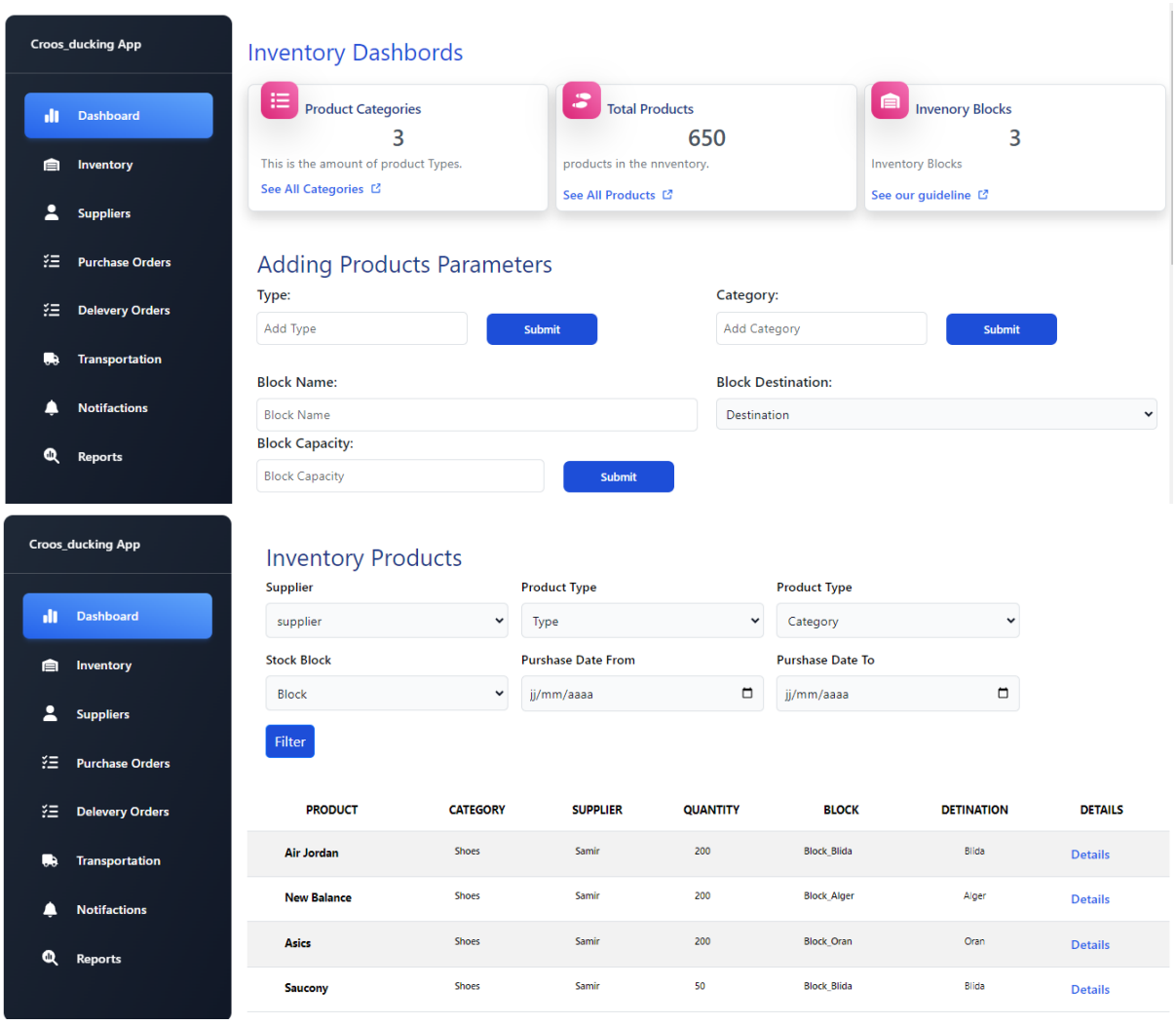

Figure 30- Inventory Dashboard

3.1.3 Delivery Order Dashboard:
3.1.3.1 Delivery Order Main Dashboard:

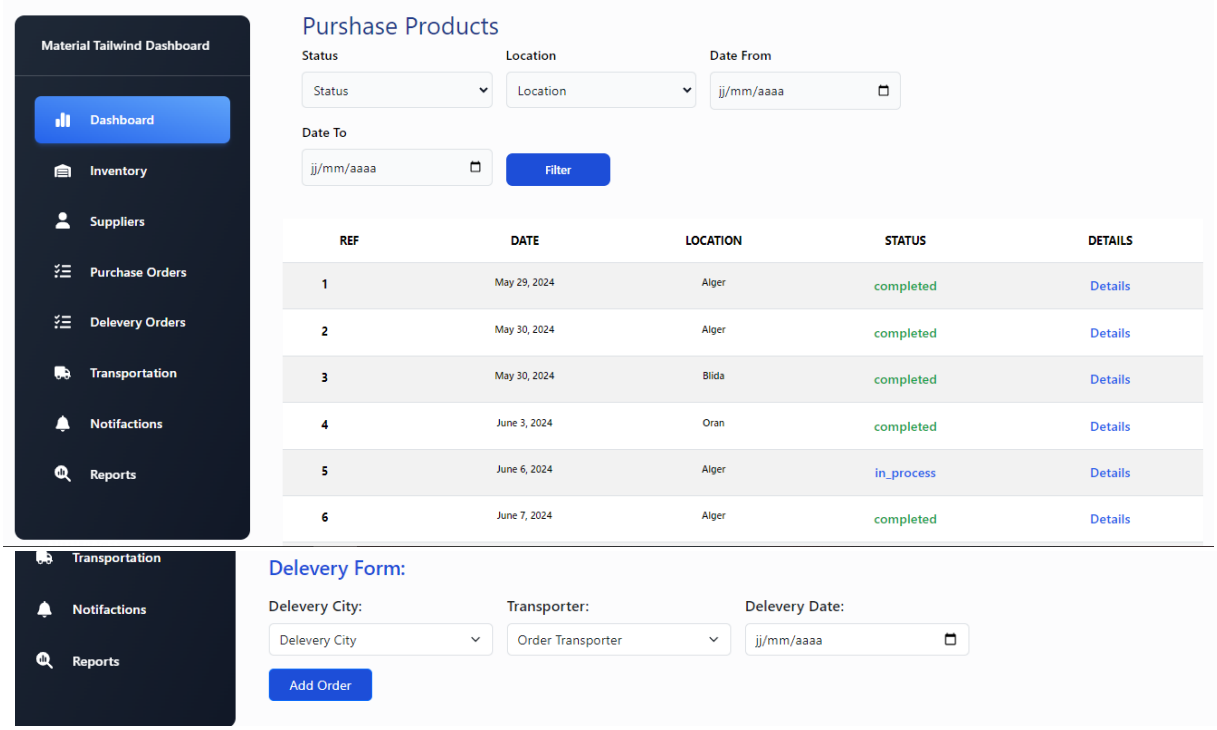

Figure 31- Delivery Dashboard.

3.1.3.2 Delivery Order Details Dashboard:

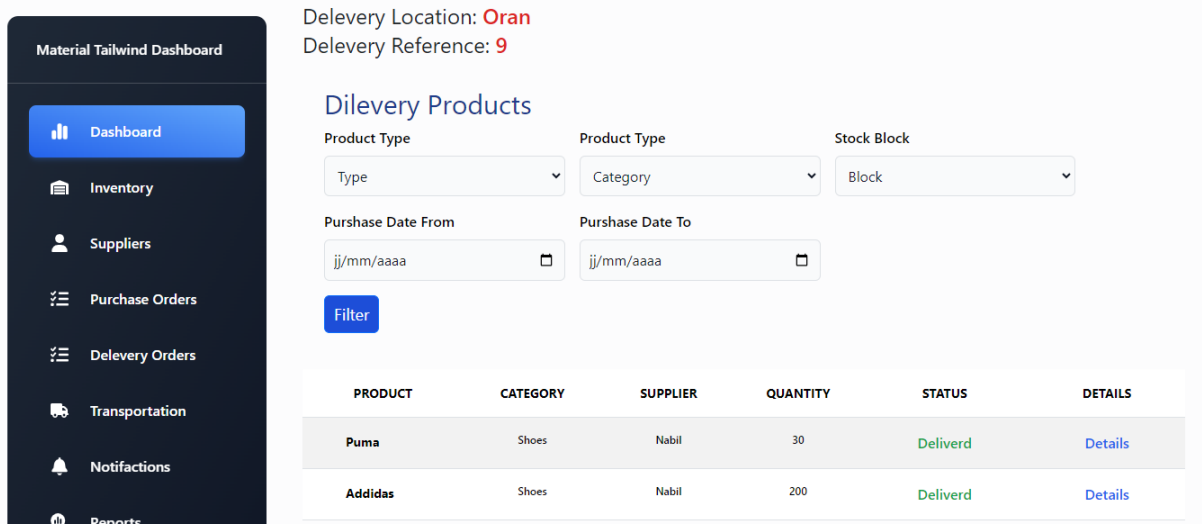

Figure 32- Delivery Details

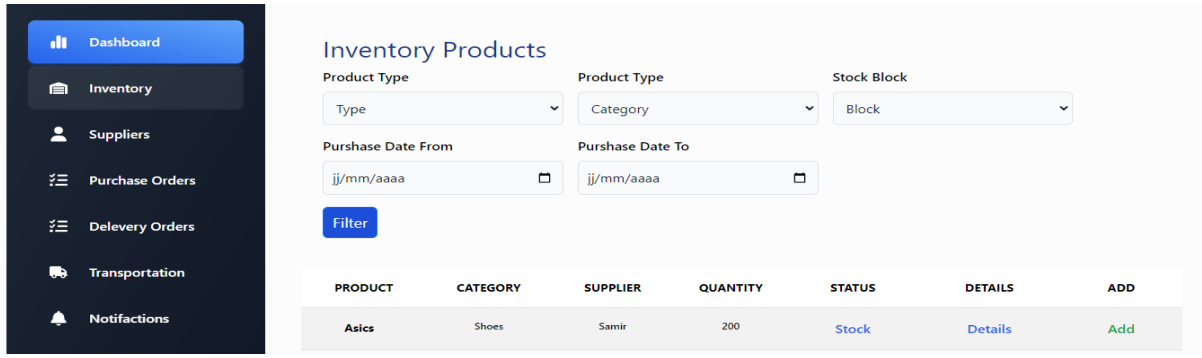

Figure 33- Add product to delivery order

3.1.4 Supplier Dashboard:

3.1.4.1 Main Dashboard:

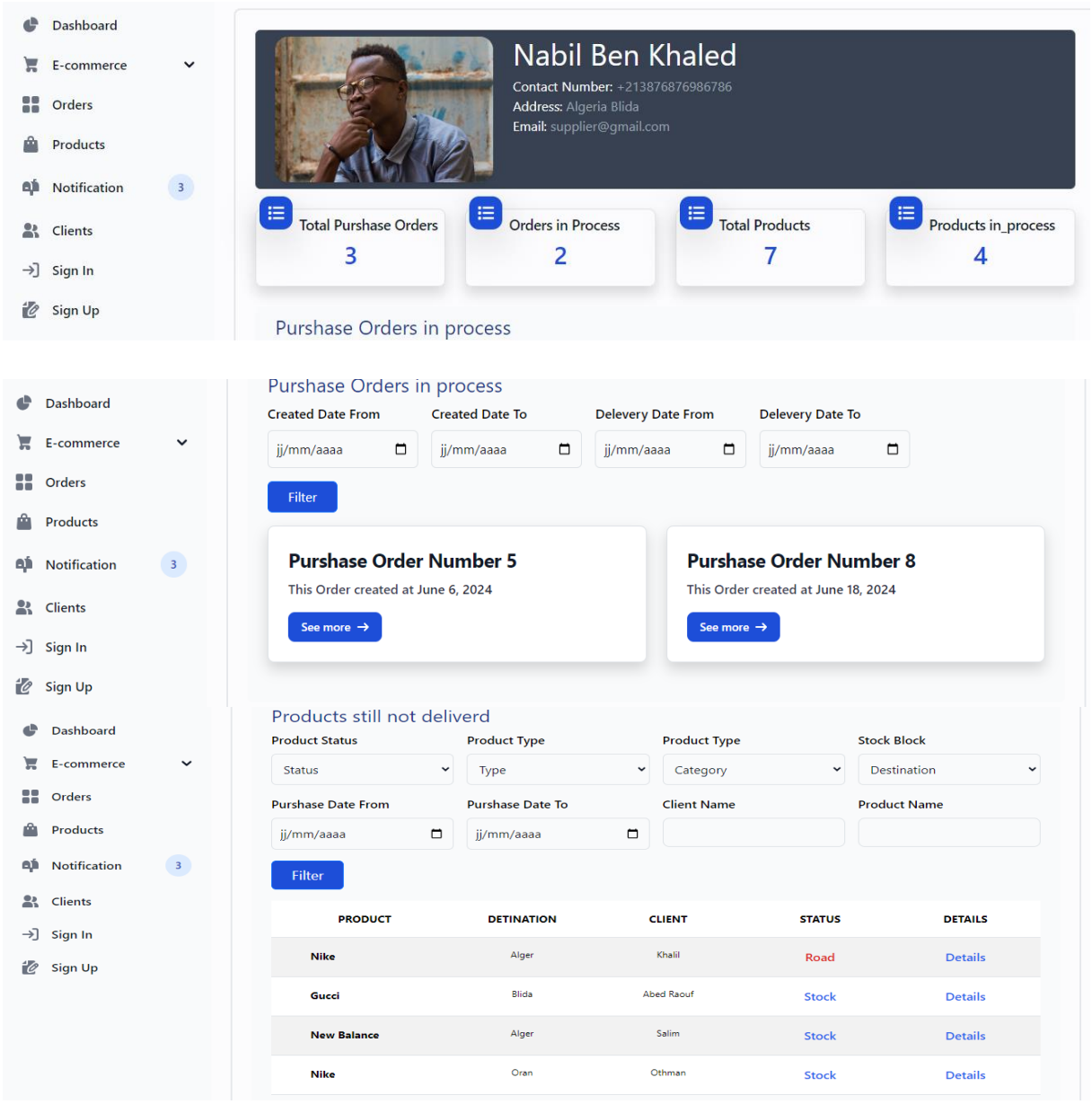

Figure 34- Supplier user main dashboard

3.1.4.2 Receive Order Details:

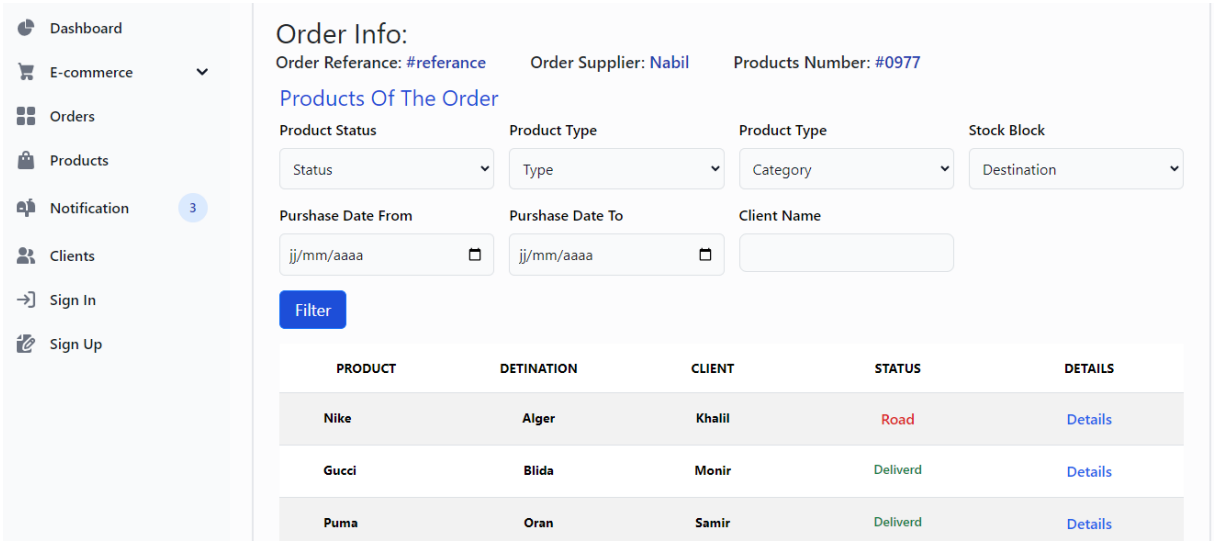

Figure 35- Receive Order Details

3.1.4.3 All Receive Orders:

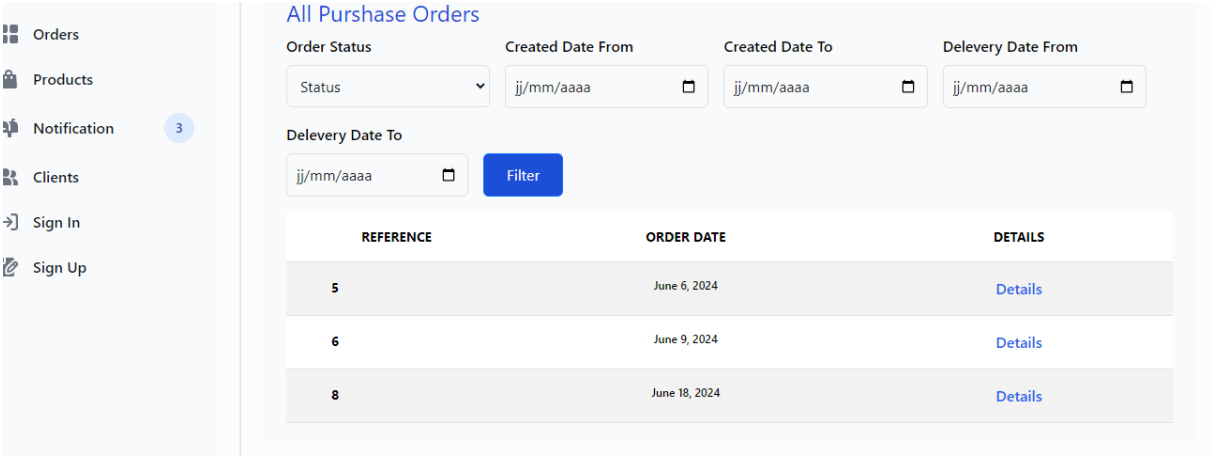

Figure 36- All Receive Orders.

3.1.4.3 All Supplier Products:

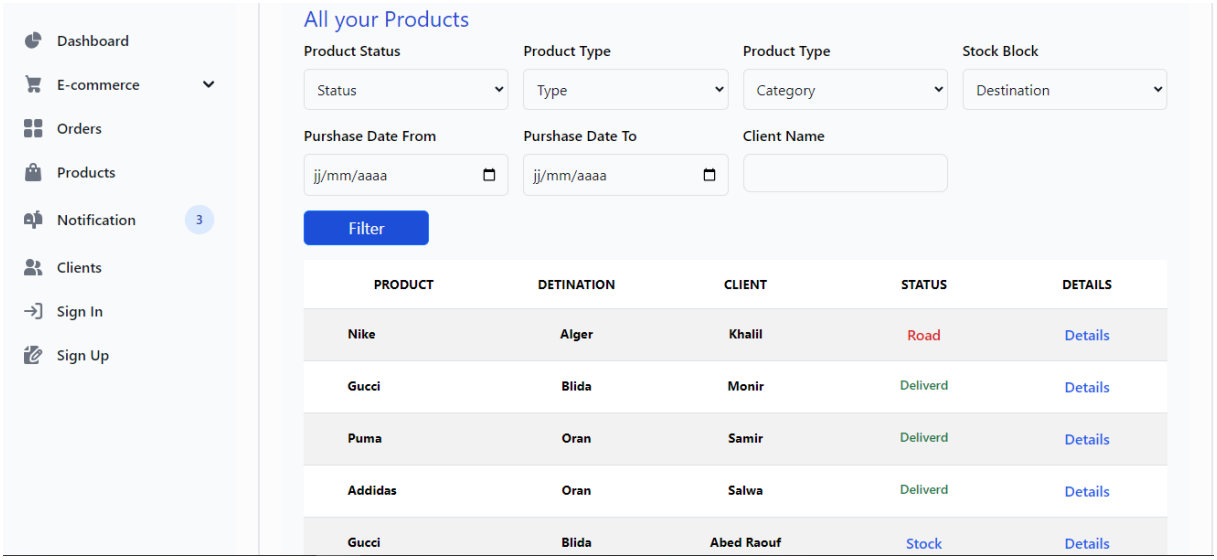

Figure 37- All Supplier Products.

3.1.4.3 Product Details:

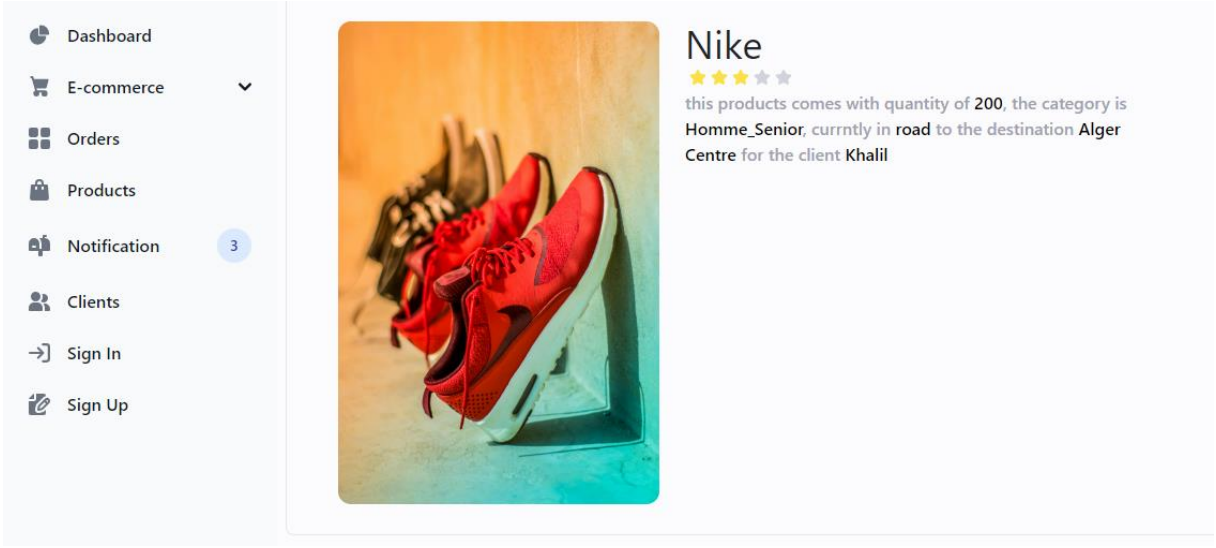

Figure 38- Supplier Product Details_1

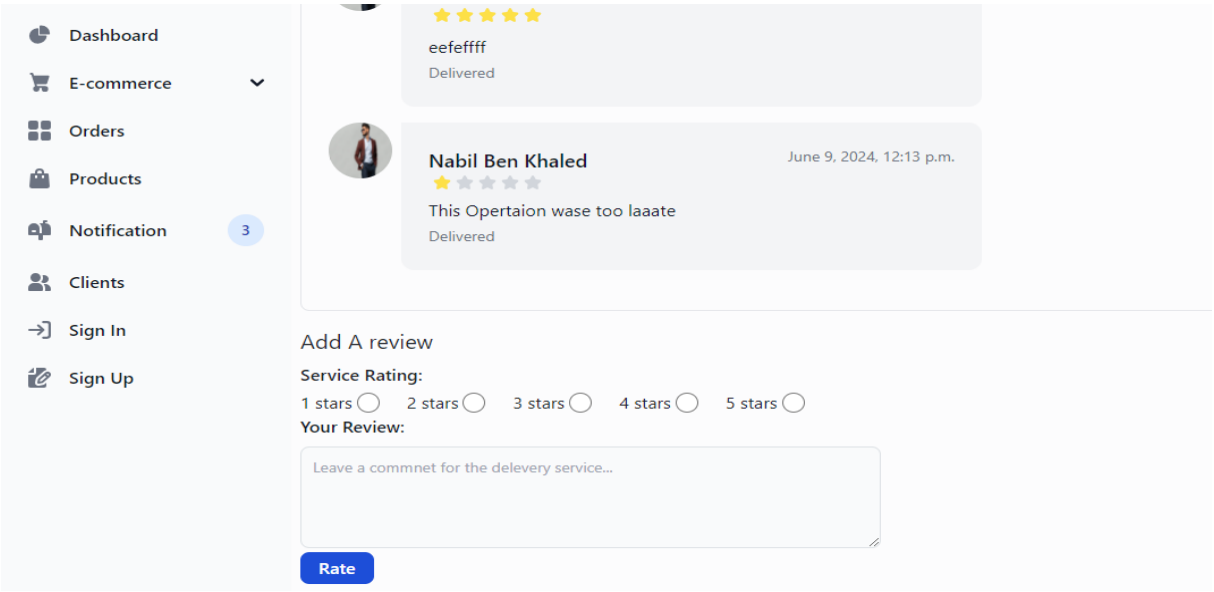

Figure 39- Supplier Product Details_2

3.1.5 Transporter Dashboard:

3.1.5.1 Main Dashboard:

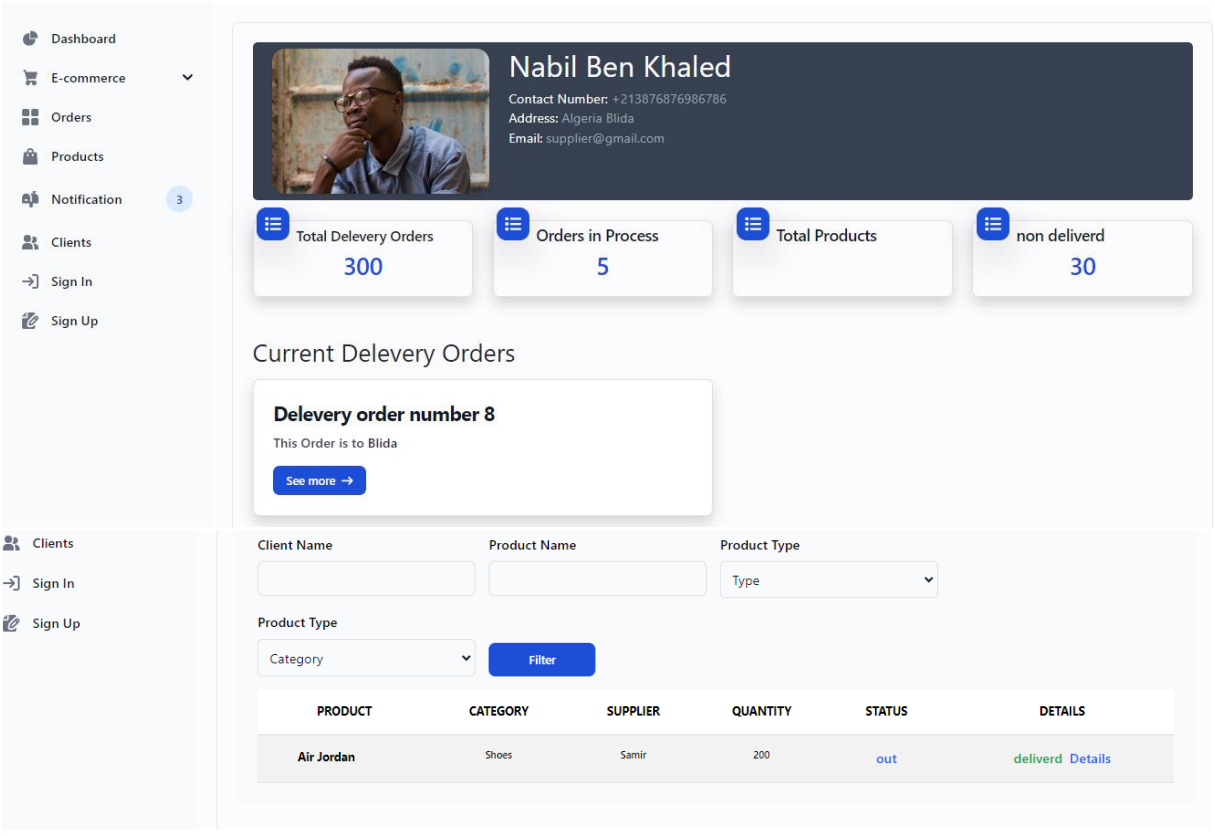

Figure 40 - Transporter dashboard

Conclusion:

This chapter has detailed the design and implementation of an ERP system tailored for wholesale distribution. Beginning with conceptual diagrams for clarity on system functionalities, we moved to practical implementation using Django. Interfaces for Business Managers, Suppliers, and Transporters were crafted to optimize operations and enhance user productivity. This ERP system exemplifies how technology can streamline supply chain management, foster operational efficiency, and support informed decision-making in wholesale distribution.

General Conclusion:

This graduation project has explored essential aspects of supply chain management, cross-docking operations, and the integration of ERP systems tailored for the shoe industry in Algeria. It has underscored the critical role of efficient logistics practices, such as cross-docking, in reducing transportation costs, enhancing delivery speed, and optimizing overall supply chain operations.

The shoe industry in Algeria faces unique challenges, including the need for streamlined logistics and inventory management to meet consumer demands effectively. The development of a specialized ERP system aimed at wholesale distribution addresses these challenges by leveraging advanced functionalities to improve inventory visibility, coordinate logistics seamlessly, and empower decision-makers with real-time data analytics.

ERP systems, as demonstrated, play a pivotal role in modernizing distribution practices. By integrating these systems, businesses can achieve greater operational efficiency, cost-effectiveness, and responsiveness to market fluctuations. This project emphasizes the transformative potential of technology-driven solutions in enhancing competitiveness and sustainability within the Algerian shoe industry.

Moving forward, the insights and solutions presented here provide a foundation for further innovation and improvement in supply chain management across similar industries. By embracing technological advancements and strategic logistics practices, businesses can navigate complexities more effectively, strengthen their market position, and drive continuous growth in a rapidly evolving global market.

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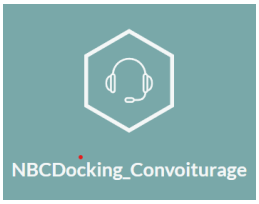
[4]: https://www.trade.gov/country-commercial-guides/algeria-ecommerce

Annex BMC on the Creation of an IT Company for Information System Development Dedicated to the Creation of a WMS for Cross-Docking.

Company Brand: NBCDocking_Convoiturage

Company Logo:



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1. Purpose of this Platform

The success of any prototype hinges on its empathy. In the wholesale sector, where there are significant varieties of finished products to be gathered from multiple suppliers and multiple logistical activities posing a heavy obstacle for the end customer, the challenge lies in managing the purchasing mission and transport mission effectively. Transport often involves oversized merchandise to maximize vehicle capacity or undersized merchandise to reduce transport load. In both cases, storage costs oppose transport costs, with a reflection on the order recall cadence.

To bridge the gap between wholesale suppliers and customers, we have established a WMS platform framed by a Cross-Docking operation to create a smooth management bridge of merchandise between suppliers and customers by zone. The objective is to provide integrated logistical support across several functions. The NBCDocking_Convoiturage platform aims to coordinate order organization, improve supplier and transport services for supply and distribution, and create visibility, transparency, traceability, and digitization. Ultimately, this service will noticeably reduce transport and storage costs.

2. Added Values

The added values are to offer logistical services for physical and information flows observed by:

-Improving the management of merchandise receipt orders from suppliers and creating a dedicated database for each supplier regarding actions and chronology.

-Enhancing and optimizing the management of merchandise transport from each supplier to the cross-docking space by receiving significant quantities, sharing, and labeling them to initiate a traceability system (information system on the client).

-Creating a clear and perfect model for order preparation towards client zones in cluster forms based on neighborhood criteria to reduce transport costs and choose the best transport means. Additionally, client service will be significantly improved by internalizing it within this value chain's logistical system.

Ultimately, the solution will offer an agile, flexible, and efficient 3PL system.

3. Platform Features

The added value summary following the creation of the NBCDocking_Convoiturage platform will be to manage an effective cross-docking system with Django. It will be possible to organize several specialized applications for each step of the logistics process. Mainly, the logistics functions will be:

-Reception from Suppliers:

-Models: Supplier, Delivery, Product

-Features: Creation and management of suppliers, reception of deliveries, recording of received products

-Traceability and Services:

-Models: Product, Movement, State

-Features: Recording product movements, tracking states (received, in transit, delivered)

-Transport Organization to the Cross-Docking Center:

-Models: Transport, Route, Center

-Features: Planning transport routes, managing cross-docking centers

-Order Management to Client Zones:

-Models: Order, Client, Product

-Features: Creation and management of orders, associating products with orders, managing clients

-Transporter Selection and Delivery to Clients:

-Models: Transporter, Delivery, Order

-Features: Selection of transporters, managing deliveries, tracking orders until delivery

-Traceability and Instance Management:

-Models: Movement, Event, History

-Features: Recording all events and movements, generating reports, audit, and operation history

4. Business Model Canvas (BMC) for Logistics Services via Cross Docking

Prototype Setup on Target 1: Creation of a BMC dedicated to service through a cross-docking model adapted to shoe reception and distribution.

State of Play: Following my internship at shoe production workshops in Médéa, I conducted a study to reduce risk by addressing the following questions:

Why is the target the shoe product?

Point 1: I live in a region renowned for this type of industry.

Point 2: The possibility of envisioning a creation space for this type of platform.

Point 3: The ease of finding the NBCDocking_Convoiturage team with IT, digital marketing economics, and shoe industry experience.

Point 4: The successful operation of the prototype developed in Django.

Point 5: Offering time, transport cost, and storage cost savings by resource sharing and optimizing order quantities for each client, given the large classes of product types in the shoe industry.

Can the NBCDocking_Convoiturage system succeed for the shoe product target?

Answer: Yes, because I proposed my innovation to potential manufacturers in Médéa, and they accepted it on the condition that I work under a third party's supervision.

Can the NBCDocking_Convoiturage system succeed for the shoe product target concerning the client?

Answer: It is successful at more than 90% because I created a site to promote digital marketing dedicated to wholesale shoe sales, strengthening the link between the client cluster and the supplier cluster via our NBCDocking_Convoiturage Cross Docking platform.

5. Presentation of the Nine Business Model Canvas (BMC) Cases

The Business Model Canvas (BMC) related to the cross-docking management platform for shoe supply and distribution is as follows:

5.1. Customer Segments:

-Shoe distributors

-Shoe stores

-Online shoe sellers

-Shoe store chains

5.2. Value Proposition:

-Optimization of real-time logistics flow management

-Reduction of storage and transport costs

-Complete product traceability from receipt to delivery

-Improved customer satisfaction through faster and more accurate deliveries

-Efficient transporter management via the cross-docking center

-Bringing customers closer to suppliers

5.3 Distribution Channels:

-Platform website

-Digital marketing website on the platform's role

-Advertising

-Mobile application

-Possibility to integrate APIs with existing client systems

-Customer support and after-sales service

-Offering a shared and more familiar transport system

-Promoting awareness of our existence via social media activities

5.4.Customer Relationships:

-Creation of a live listening and guidance support

-Dedicated customer support and training

-Online assistance and digital documentation (via the created website)

-Intuitive and customizable user interface

-Loyalty and reward programs for regular customers

5.5 Revenue Streams:

-Monthly or annual subscription to the platform

-Transaction fees per delivery

-Premium services (advanced analyses, detailed reports)

-Personalized training and technical support

5.6.Key Resources:

-Platform development and maintenance team

-Cloud infrastructure for data hosting and storage

-Database of suppliers, products, transporters, and clients, traceability

-Logistics flow management and traceability algorithms

5.7.Key Activities:

-Continuous development and improvement of the platform

-Managing integrations with third-party systems

-Customer support and training

-Marketing and new customer acquisition

-Monitoring and analyzing logistics performance

5.7.Key Partners:

-Shoe suppliers

-Transporters and logistics services

-Cross-docking centers for other areas

-Cloud services and hosting providers

-Technological partners for integrations

5.8. Cost Structure:

-Platform development and maintenance costs

-Cloud infrastructure and hosting fees

-Salaries for the development, support, and sales teams

-Marketing and customer acquisition

-Customer training and support

5.9. Cost Management

For detailed cost and charge management from implementing this cross-docking platform for shoe distribution, various cost categories and functions are associated:

Cost Categories and Charges:

1. **Infrastructure Costs:**
    - **Information Hosting and Storage:**
        - Cloud servers (AWS, Google Cloud, Azure)
        - Database services (SQL, NoSQL)
        - Backup and recovery solutions
        - **Cost:** €100 to €300 per month (15,000 DA to 45,000 DA)
    - **Workspace Rental:**
        - Offices for the development and support team
        - Maintenance and utility costs
        - **Cost:** 500,000 DA annually for training, 25,000 DA per month for space rental + 10,000 DA for maintenance (average of 35,000 DA/month)
    - **Office Equipment:**
        - Office furniture (chairs, desks, etc.)
        - Office supplies (paper, pens, etc.)
        - **Cost:** 2,000 DA/month
    - **Computers and Development Equipment:**
        - Laptops and desktops for developers
        - Peripherals (monitors, keyboards, mice)
        - Software and licenses for development
        - **Cost:** 2,000,000 DA over 5 years (25,000 DA/month)
2. **Operational Costs:**
    - **Employee Salaries:**
        - Developers
        - Support and maintenance staff
        - Administrative staff
        - **Cost:** 5 employees at 85,000 DA/month per employee
    - **Third-Party Services:**
        - API subscriptions or other software tools
        - IT security services
        - **Cost:** 500 DA/month for antivirus
    - **Marketing and Customer Acquisition:**
        - Online advertising (Google Ads, social media)
        - Participation in trade shows and conferences
        - **Cost:** 200,000 DA annually (18,000 DA/month)
    - **Customer Training and Support:**
        - Training programs for clients

        - Technical support and online assistance
        - **Cost:** 10,000 DA/month

Associated Functions:

1. **Infrastructure Management Functions:**
    - **Hosting and Storage Management:**
        - Monitoring server and database service costs
        - Optimizing resource usage to reduce costs

Summary:

In today's competitive business environment, companies continually seek to streamline their processes and optimize activities to improve efficiency, reduce costs, and enhance overall performance. This pursuit is driven by the need to stay agile and responsive to market demands while maintaining high standards of product or service delivery.

Résumé :

Dans l'environnement commercial compétitif d'aujourd'hui, les entreprises cherchent continuellement à optimiser leurs processus et leurs activités pour améliorer l'efficacité, réduire les coûts et renforcer leurs performances globales. Cette démarche est motivée par la nécessité de rester agiles et réactives face aux demandes du marché tout en maintenant des normes élevées de livraison de produits ou services.

ملخص:

في البيئة التجارية التنافسية في الوقت الحالي، تسعى الشركات باستمرار إلى تحسين عملياتها وتحسين أنشطتها لتحسين الكفاءة، وتقليل التكاليف، وتعزيز الأداء العام. هذا السعي يأتي نتيجة الحاجة إلى البقاء مرنين ومستجيبين لمتطلبات السوق مع الحفاظ على معايير عالية في تقديم المنتجات أو الخدمات.