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A Dissertation in Fulfillment
For the Requirements of the Degree of Master in Computer

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FILIERE: Informatics

OPTION: Information Systems and Software Engineering

By: AHMED Nedjm eddine **and** CHETRAUI Nassim

Entitled

Desktop application connected to an ERP platform to manage the sales process, from design to order fulfillment

Presented publicly to the jury:

Dr. YAGOUBI Rached	**University of M'sila**	**President**
Dr. LOUNNAS Bilal	**University of M'sila**	**Supervised**
Dr. NOUIOUA Layla	**University of M'sila**	**Examiner**

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DEDICACES

Firstly we thank Almighty God for allowing us to reach this stage. This work is for us the starting point of a great adventure, the adventure of research, a cause for constant improvement. Allow us to pay a big tribute to the supervisor Dr. LOUNNAS Bilal who supervised this work and gave his time to make this note a success, and we also thank Mr. MAHROUG Abd Elhamid Project Manager of HISBA ERP for giving us the opportunity to work on this project. We also thank our families who gave us their full support As an expression of our sincere gratitude. We thank the jury members Dr.YAGOUBI Rached and Dr.NOUIOUA Layla for accepting to evaluate our current work.

I dedicate this work to our parents, To our colleagues who made the master's years better.

to our family.

To our dear friends.

For everyone we love.

To all who love us.

I dedicate this work to you.

CHETRAUI Nassim AHMED Nedjm eddine.

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I.General Introduction

start-ups to small businesses all the way to huge brands, there are a large number of companies that can benefit from the software, where they can sell their products or services. In today's society focused on competition, convenience and speed, consumers and sellers can no longer afford ,Significant time during the buying and selling process, making the point of sale software a flexible solution for both buyers and sellers.

I.I Problematic

and selling operations are frequent in the daily life of all people, but performing these operations very quickly while performing them is difficult, especially for sellers. The lack of a special program leads to a lack of performance.

I.II Motivation

speed of the performance of sales and purchases and the convenience of customers are among the company's commercial goals, and its expansion is a priority for its owners, and in order to grow, it must maintain its customers with better performance, so what are the best ways to improve the performance of buying and selling. Also, one of the reasons was that we wanted to get into the world of programmingby improving trading performance in general.

I.III Outline

dissertation is divided into four chapters ,chapter one we will talk about the ERP in general,in the second chapter we will talk about Melouki Group , HISBA ERP and point of sale in the third chapter we will introduce our app and the implementation, analysis and design of our POS, in the fourth chapter we will talk about system realization and this chapter is divided into four sections Languages , Development environments, Framework and design.

Chapter One

In this Chapter we will talk about Enterprise Resource Planning (ERP) from first appear to present.

1 Chapter One : Enterprise resource planning (ERP)

1.1 Introduction

ERP, also called Integrated Management Software (PGI), are applications whose purpose is to coordinate all the activities of a company (so-called vertical activities such as production, supply or horizontal ones such as marketing, sales forces, human resources management, etc.) around the same information system. Integrated Management Software packages generally offer Groupware and Workflow tools to ensure transversality and the circulation of information between the various departments of the company. The term "ERP" comes from the name of the MRP (Manufacturing Resource Planning) method used since the 1970s for the management and planning of industrial production. [41].

1.2 Definition

Enterprise resource planning (ERP) is a process used by companies to manage and integrate the important parts of their businesses. Many ERP software applications are important to companies because they help them implement resource planning by integrating all of the processes needed to run their companies with a single system. An ERP software system can also integrate planning, purchasing inventory, sales, marketing, finance, human resources, and more.[36]

1.3 History of ERP

1.3.1 A Brief History of ERP

The term ERP was first used in the 1990s by the Gartner Group, but enterprise resource planning systems actually have their roots deep in the manufacturing industry, and can trace their history back to the 1960s. At this time, manufacturers needed a better way to manage, track, and control their inventory. Basic software solutions, known as MRPs or Material Requirements Planning systems were developed to meet their needs. These systems helped manufacturers monitor inventory, reconcile balances, as well as included very basic manufacturing, purchasing, and delivery functions. Through the 1970s more and more manufacturers started to adopt MRP systems, and the systems themselves got more sophisticated. By the 1980s MRP systems evolved into what became known as MRP II or Manufacturing Resource Planning systems. More manufacturing processes were added into the original MRP systems, and these MRP II systems had expanded capabilities and were better able to handle scheduling and production processes. In the 1990s the first true ERP systems came into use. These systems further expanded beyond the basic inventory control and manufacturing processes of previous iterations to include other departments and functions, such as accounting, finance, and sales. These systems set the stage for ERP solutions as we've come to know them today, by integrating multiple processes and departments into one system.[23]

1.3.2 History of ERPs in the modern manufacturing world

Today's ERPs are fully integrated systems that can connect every department and all aspects of your business in one place. Modern ERPs provide a company with a powerful, real-time tool that runs a single, shared database of information, which can be accessed by every department in an organization. The ERPs of today are also extremely flexible and vendors offer a variety of tools, features and functionalities, designed to meet the unique needs and challenges of different industries. Modern ERP solutions not only include manufacturing, supply chain management, and financial and accounting capabilities, but they also can have advanced reporting and business intelligence, sales force and marketing automation, CRM management, and project management functionalities.[23]

1.3.3 History Flow

New sets of comprehensive systems, or MRPs, were developed in the 1960s. These focused on product integration and planning according to a master production schedule (Rashid et al. 4). SAP, a global leader of ERP systems, developed its first system in the 1970s (Nijher 4). The 1980s saw the development of the second generation of what were now known as manufacturing resources planning (MRP II) systems, which focused on optimizing manufacturing processes by synchronizing material and production requirements (Rashid et al. 4). Another global ERP brand, People-Soft, was also developed in this period before it was bought in 2005 by another global leader in ERP, Oracle (Nijher 4). Even though some ERPs appeared in the late 1980s, the most significant enterprise-wide coordination and integration was the 1990s (Rashid et al. 4). ERPs developed and implemented in the 1990s could run on multiple platforms and integrate different business processes, including manufacturing planning, financials, project management, procurement, transportation, and marketing (Nijher 4). [17]

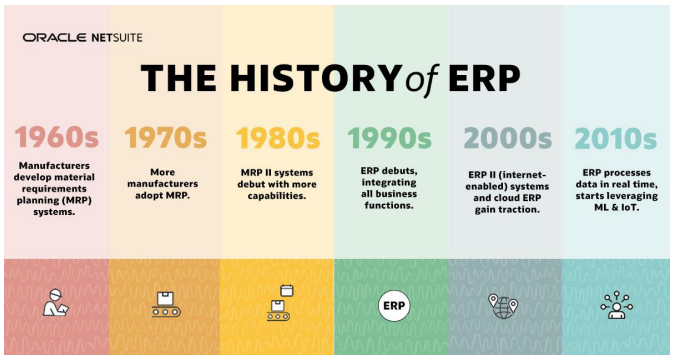

Figure 1: History Flow

1.4 ERP Architecture

ERP technical architecture basically defines layout of layers of application deployment between servers and desktops, interfaces and software objects. ERP architecture is no more meant to just provide technical functionality, user interface and platform support but should be able to absorb emerging technologies. It should be expandable and maintainable to meet future business needs such as business process changes, merger and acquisitions, compatibility with future regulations etc. [16]

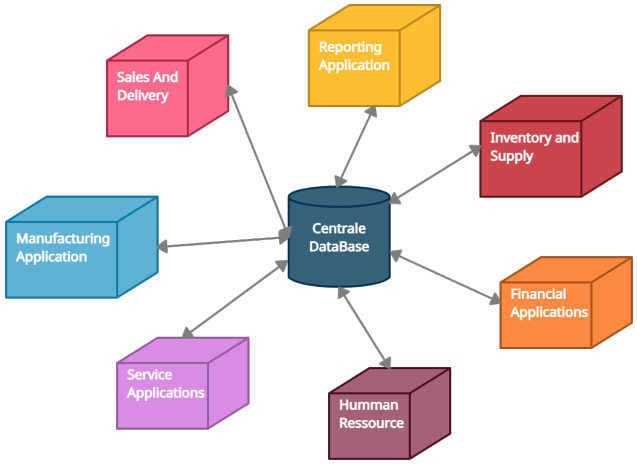

Figure 2: ERP Architecture

1.5 Characteristics of an ERP

The four characters of an enterprise resource planning (ERP) system includes the following:

- **Modular Design** - The modular design of an ERP system incorporates distinct business modules such as manufacturing, financial, accounting, and distribution. Each module takes care of various functions of a particular section or department within your organization. While these modules can operate separately, they are integrated inside the ERP system to provide a seamless flow of data and information between all modules. This ultimately will enlarge the operational transparency provided for by the standard interface. These separate modules work in real-time with online and batch-processing capabilities[27].
- **Central Common Database** - Implementing a common centralized database management system, which is also called a DBMS, is an important characteristic of an advantageous ERP system. All data is entered and stored only once and then utilized by all departments simultaneously which helps eliminate data-entry errors and other flaws associated with using a distributed database[27].
- **Flexible and Open Database** - Organizations are almost always dynamic in nature, which is where ERP systems offer flexibility to respond to the changing needs of the enterprise. These systems have an open system architecture, allowing them to attach or detach any module as and when required without affecting the other modules. An advantageous ERP system should support connectivity to other business entities within the organization and shouldn't be confined within the boundaries of a manufacturing facility[27].
- **Automatic Generation of Information** - An ERP system provides business intelligence tools such as executive information systems, decision support systems, easy warning systems, and more. These tools help manufacturing operations to make data-based decisions that pertain to their overall production process. All financial and business information will be automatically generated from the data that is found in the centralized database of the ERP system[27].

1.6 The components of an ERP

Five Main Components of the ERP system are as follows:

1.6.1 Finance

It keeps a track on all your financial data including Accounts receivable, Accounts payable, General ledger, costs, budgets, and forecasts. It helps to keep a record of cash flow, lower costs, increase profits and make sure that all the bills are paid on time. The growing complexity of the business makes important the need to have a single system to manage all of the financial transactions and accounting for multiple business units or product lines [11].

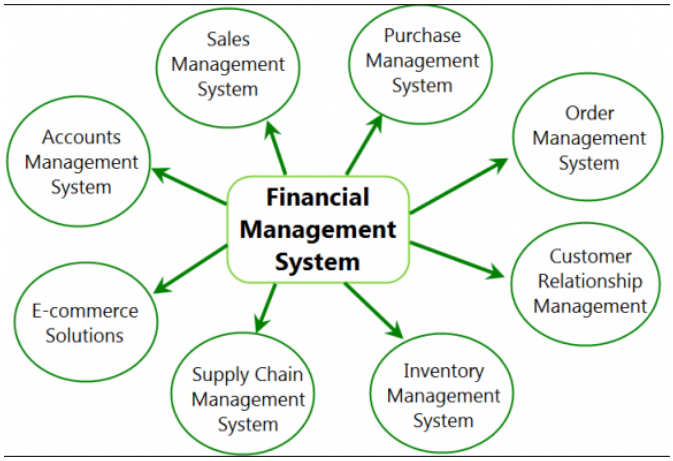

Figure 3: Finance

1.6.2 Human resource (HR)

Enterprise resource planning (ERP) refers to the personnel administration element in a larger ERP software package. By including payroll, benefits management, recordkeeping, and similar HR tasks under the same digital umbrella as other business elements, HR professionals can access broader data to make smarter high-level decisions[2].

Figure 4: Human Resource

1.6.3 Manufacturing and logistics

It as a group of applicants for planning, production, taking orders and delivering the products to the customers. It provides you a view of the demanded and achieved levels which is important to check whether you are achieving your targets or not. It provides all the stock summary and production plans beneficial for the business. It includes Production planning, order entry and processing also the warehouse management [11].

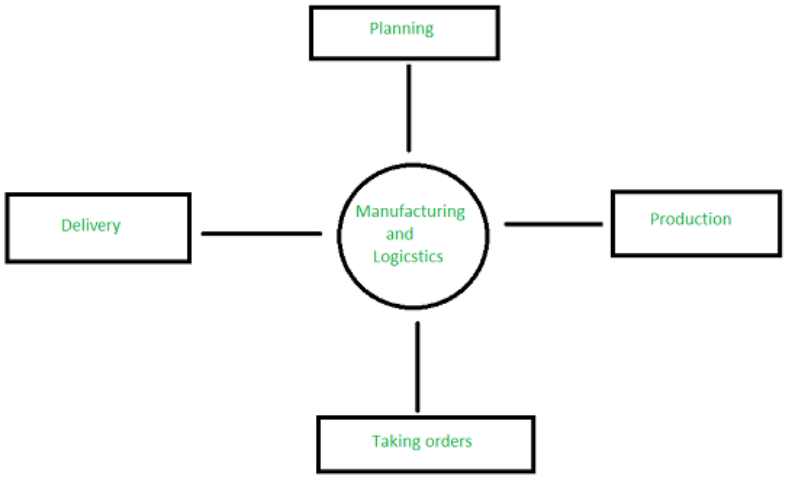

Figure 5: Manufacturing and logistics

1.6.4 Supply Chain Management (SCM)

Creating an efficient supply chain isn't exactly easy, even when deploying software to help you out. The supply chain management (SCM) component of an ERP system is one of the most crucial for this reason. You need the best SCM features to be able to optimize your supply chain, and that starts by collecting real-time data.

Real-time data allows you to keep tabs on your supply chain, so you can find and fix issues as they happen, rather than waiting until you receive the data a day or more after the fact. It also makes predictive analytics possible. The SCM component, with the aid of real-time data, can help with demand planning, so you can create an up-to-the-minute accurate production plan that meets demand, but doesn't exceed it [21].

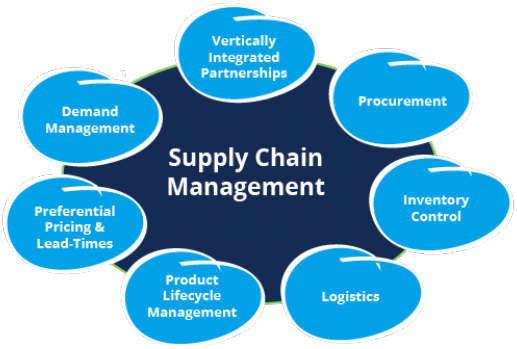

Figure 6: Supply Chain Management

1.6.5 Customer Relationship Management (CRM)

Managing your customers and leads is another crucial facet. Without them, your business can't survive. A CRM tool stores and tracks generated customer and lead data, helping you develop helpful insights for sales and marketing improvements. One primary CRM use is tracking customer buying habits. With this information, you can see which products lack sales and the best timeframes for upselling. Additionally, you can use this module to track conversation history with leads to know which sales personnel spoke to clients, when they talked and what they discussed. This data reduces redundancy and customer irritation for more successful profits. If you run an eCommerce business, you may want to integrate your CRM process to target ads accurately and preserve customer payment information. These features guarantee that customers have the most streamlined buying experience possible. This solution is just one example of how to benefit your customers.[13]

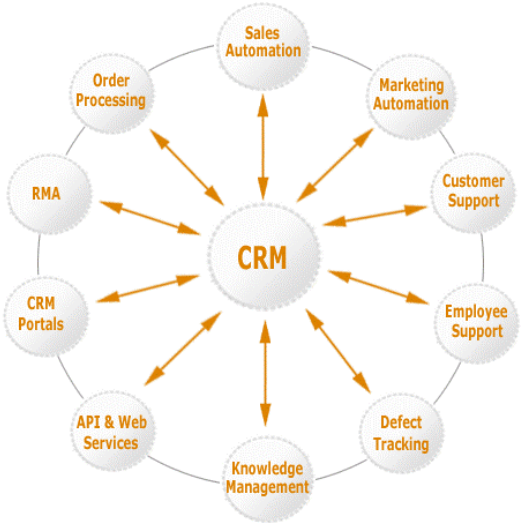

Figure 7: CRM

1.7 Choosing an ERP

1. **The Functional Fit for Your Organization** This might seem straight forward but evaluating how the functionality of ERP software products and services fit with your business is the most important (and time consuming) aspect in the ERP selection process. Finding the best functional fit includes evaluating ERP software, watching ERP demos, and meeting with solution consultants. It also includes internal work. One of the most helpful things you can do during a selection project is facilitate internal discussions to determine your business requirements for ERP and outline the functional areas to address. Key questions that can help shape these discussions are:

   - What is outdated about your current system? Why are you considering a new ERP?
   - What works well with your current business systems?
   - What manual processes could you potentially automate?
   - In what areas of the business are you lacking visibility – or have a hard time with reliable business reporting?
   - What other systems need to be integrated with the ERP?

   The result should be a detailed list of requirements for new ERP software solution. The list should be prioritized and agreed upon by key leaders within the organization – with buy-in from IT as well as the overall executive team [37].

2. **Industry Experience** Another good question to ask during an ERP selection is: what ERP software is used in your industry? While not necessarily industry-specific, some ERP solutions are optimized to perform best in industries such as manufacturing and distribution. This is an important question that can help narrow the list of the ERP software you evaluate. Industry is a factor to consider not only with your software vendor (Oracle, Microsoft, Infor, NetSuite etc.) but also with your implementation partner. Whether or not the vendor and the implementation partner has had success in your industry is essential [37].

3. **Price**: There are a few areas to consider when it comes to the price of your ERP software and implementation. Return on Investment The ROI of a new ERP can be measured in a few ways.

   - Are there are specific areas of the business where cost savings can be achieved through new technology? For example, better inventory management, faster financial close, automating manual or time-consuming tasks.
   - Are there technology costs that can be reduced through the new ERP? Cost savings can result from a reduction in hardware or support, new software licensing agreements, or a reduced software footprint.
   - What is the long-term ROI? There is no question that the initial software and implementation cost will be a financial investment for your organization. What does the ROI need to be after year one, year five, and beyond, to make the new technology worth it for your business?
   - What capabilities will new ERP software enable? Faster ship times, better customer service, streamlined business processes, operational efficiency, modern e-commerce, warehouse and inventory management, real-time business reporting. These are a few of the potential new benefits that should be considered during an ERP selection process [37].

4. **ERP Vendor Viability**: The viability of an ERP software vendor is crucial to consider as far as ERP selection criteria, including:

   - Product viability: how long has the product been on the market, what is the future software roadmap, what is the research and development investment in the product.
   - Size of customer base: how many active customers use the software?
   - Financial status: how solid is the software company? [37]

5. **ERP Implementation Project Considerations**: Finding the right ERP consulting partner for your business is step one for any successful implementation project and is a necessary aspect of ERP selection criteria. As you select your ERP software, and implementation partner, below are some aspects of the implementation project to consider:

- Timing for the business. Is it the right time to take on this project? If not, when? This is often a difficult question. In most cases, there's never the perfect time – however there might be better times than others. For example, after a merger or acquisition might be the right time, or when deciding between a major (expensive) upgrade of your current system versus new software. Otherwise, the right time depends heavily on your team.
- People and executive support. An ERP implementation needs both executive support and involvement, as well as upper management and other key internal leaders on the project.
- Methodology and a project plan. To be successful, an ERP implementation methodology is fundamental. Thorough project planning and project communication tools are also keys to success [37].

6. **The Technology**: In addition to software functionality, there are other technology considerations that are important to the ERP selection process. Best-in-class ERP software includes, at a minimum, these technology features:
   - End user reporting tools – easier access to information, no development skills necessary.
   - Simplicity in UI and UX.
   - Business intelligence.
   - Data security.
   - Reliable system performance and response time – very limited downtime.
   - Ability to integrate with other systems.
   - Ability to make necessary customizations [37].
7. **Risk**: Technology and ERP projects at the enterprise level inherently come with some risk. Selecting an ERP software with functionality that fits your business, along with many of the other criteria on this list (vendor viability, selecting the right partner, project planning, cost, executive support), goes a long way in mitigating risk during an ERP implementation. Taking the time to create a thorough map of the key business processes that are essential for the operations of your organization, and using that throughout the ERP selection and implementation, will also negate risk. Essential elements to map out include integrations with other systems as well as necessary ERP customizations for your organization. Change management and end-user training are also key areas to plan for in order to avoid risk[37].

1.8 The Benefits of ERP

There are many different ERP systems out there, but for the purposes of this post, we're going to focus on the benefits of using ERP on the Salesforce platform. While many of the benefits are the same across the board, Salesforce enables additional capabilities and integrations to further connect business operations that would not otherwise be possible. Here are the 10 primary advantages of a Salesforce-native ERP system that will help position your business for success.

1. **Aximized planning and resource management**: Enterprise Resource Planning is aptly named because it truly does enable planning across your organization so you know how to predict and forecast sales, costs, and the resources you need, whether that's materials, equipment, or people. ERP provides insights that enable you to effectively plan production schedules and forecast resource needs. When you can be predictive with events like equipment maintenance or order fulfillment, you can reduce unexpected downtime or production delays. Better planning and resource management enable business leaders to make more effective decisions and overcome challenges across the entire business [10].
2. **Greater enterprise collaboration**: Personnel are often siloed across an organization, but ERP consolidates information from all departments into a single source of truth, making it simple to share accurate data in real-time. Making all data available in one place, updated in real-time, has several operational benefits [10]:
   - Reduce errors often caused by using incorrect or outdated data.
   - Keep projects that otherwise could have been stalled due to a lack of information on track.
   - Graduate from merging disparate data sources and be confident in the accuracy, completeness, and security of your ERP-enabled data.
   - Eliminate human error that can come with manual data entry processes

3. **Increased productivity**: By automating major processes like inventory tracking or invoice generation, you can realize productivity gains across the board and place greater focus on tasks that may have otherwise fallen by the wayside. And, we can't restate enough the incredible time savings of having a single source of truth for data across departments. Manual data entry processes that took up valuable time in the past are now handled automatically – and with greater accuracy to save time on revisions. ERP can perform advanced calculations quickly and automate tedious tasks. Your employees can place greater focus on a project, create more revenue-generating work, and use their time more efficiently and profitably. Enabling teams to collaborate using accurate information enhances the success of your projects and ultimately brings about greater customer service [10].

4. **Reduced overhead costs**: When used properly, ERP systems can deliver significant cost savings to your organization as follows: [10].

   - Prevent disruptions and delays that can be caused by a lack of accurate or available information, keeping projects on track and on time..
   - Skip the additional personnel, software licenses, training on multiple systems, and administrative resources needed for traditional data unification software; ERP can be easily adopted and leveraged by existing staff.
   - Streamline operations by making the tools for everything from product development to accounts payable available in one centralized system .
   - Empower your team to use their time more efficiently by giving them the information and data they need, right at their fingertips.

   Additionally, an ERP system provides greater visibility into changes in cost. Let's say you typically pay 1 doallar for a part, but suddenly the part costs 3 dollars. ERP will make it easy for you to see that cost differential so you can explore a different vendor or make adjustments to your budget to accommodate that additional cost [10].

5. **Better customer relationships**: Using ERP on Salesforce allows for integration with your Salesforce Customer Relationship Management (CRM) platform, drastically expanding the visibility you have over your operations. All customer information from purchase history to personal data is stored in one place and feeds directly into your ERP system to enhance the customer experience. Using your ERP and CRM together, you can automate customer services like payment notifications for existing customers, or lead nurturing tactics for prospects currently in the sales pipeline. You can also enable sales and marketing teams with greater information to help close a sale. Here are some other key benefits of an ERP and CRM solution [10]:

   - Streamline invoicing and accounts receivable.
   - Close the books faster at the end of each month.
   - Reduce billing or invoicing errors for a better customer experience.
   - Put customers in the driver's seat with customized dashboards and portals.
   - Connect product, sales, and finance teams for alignment on product offerings and available revenue streams.
   - Generate impactful global financial reports using built-in analytics powered by Salesforce Tableau/Einstein.
   - Offer actionable, easily digestible information to your entire team through real-time dashboards .

6. **Improved quality control**: Quality management is a significant benefit of an ERP system. Let's say you have a product that has just completed the manufacturing process, but before you can sell the product, you still need to review and sign off on the corresponding paperwork. You can tell your ERP system that the product must be blocked from sale until the paperwork is approved. This type of control over your internal flow of supply reduces the chance for error; i.e. someone clearing out a product that has not yet been officially released. Additionally, ERP provides checks and balances over the system itself, so you can allow only the appropriate people to create or edit information, but make the information visible to those who need to see it. This kind of quality control over sensitive and timely data reduces human error and saves time when processes move more seamlessly among departments [10].

7. **Better inventory tracking**: Tracking and monitoring inventory is a challenge, especially for large companies that constantly have products coming in and going out and a high level of customer demand. ERP systems are able to track individual inventory using serial numbers or RFID tags, and simple system inputs allow you to maintain visibility over all of your assets, even at different locations or when they're in transit. Supply chain management is simple, too – ERP simplifies logistics and distribution, and can be programmed to manage inventory goals and reduce inefficiencies. What's more, inventory tracking using an ERP system provides highly accurate inventory data for metrics like customer demand, the cost to ship or store, and over-or under-stocked items. In short: ERP allows you to better manage your inventory and control how costs are allocated [10].

8. **Simplified risk management regulatory compliance**: Every business takes on some form of risk in the process of creating and disseminating products. ERP helps minimize those risks by reducing the likelihood of errors in accounting and financial processes and allowing for greater visibility and control over operational details. With forecasting tools, you can see whether you'll need to increase labor to handle a busy season or ramp up production to handle growing demand. Where revenue is concerned, every industry carries recognition rules and other compliance regulations that can result in fines or penalties if not properly managed. For this reason, companies need to be extremely accurate for IRS compliance, and an ERP system allows you to manage your finances accurately, legally, and easily with built-in auditing tools and easily generated reports [10].

9. **Enhanced data security**: Using ERP on Salesforce is the most secure way to store your data, hands down. ERP systems in general have built-in security controls to ensure data protection, but when used on the Sales force platform, you get the benefit of the massive investments Salesforce has made into its security, ensuring the most up-to-date capabilities for event monitoring, authentication, encryption, and more [10].

10. **Predictability scalability**: Without question, an ERP system allows your business to be more predictive, driving better business results that enable you to scale. You're able to combine real-time data with greater flexibility and visibility, which gives you an enormous advantage when it comes to efficient product development. Not to mention, changes in the market won't have you stalled and grasping for a plan. You'll already have accounted for fluctuations so you can keep your business running smoothly [10].

1.9 The Disadvantages of ERP

1. The installation of the ERP system is costly. ERP consultants are very expensive take approximately 60 poucent of the budget.

2. The success depends on the skills and experience of the workforce, including education and how to make the system work properly.

3. Resistance in sharing internal information between departments can reduce the efficiency of the software. The systems can be difficult to use.

4. Change of staff, companies can employ administrators who are not trained to manage the ERP system of the employing company, proing changes in business practices that are not synchronized with the system.

5. Having an ERP system has many advantages, but does not guarantee the total success of the company. Organizational culture, know how to involve staff and anticipate changes that will suffer the organization using this system of administration, are important elements for the completion of the implementation.

6. The effectiveness of the ERP system may decrease if there is resistance to share information between business units or departments. Due to strong changes that implementation of the ERP system brings in the culture of work, there may be poorly trained or disinterested in making use of the same staff...

7. The benefits of having an ERP system are not presented immediately with the implementation of the software, they will be evident long after the system is running.

8. The culmination of the implementation depends on the ability and skill of the workforce, also involves education and training, to make the system is correctly applied. [4]

1.10 The principal proprietary ERPs

Today, many proprietary ERPs exist on the market. We will mention in what follows, some major publishers: SAP (Business One) SAP is the world leader in ERP, is a client-server application. Its modules cover all business management functions and each module covers complete management needs. This software package quickly gained significant success with large companies by offering a multilingual and multi-currency software package. Oracle (JD Edwards) is an integrated management software package. Formerly called People Enterprise One or One World XE or ERP 8 and sold by J.D. Edwards then by Peoplesoft. J.D. Edwards was acquired by People Soft and then by Oracle. The product has since been renamed "Oracle JD Edwards Enterprise One". It is composed of several independent modules. ERP SAGE Is an integrated management software package (ERP/PGI), designed for structures with 20 to 500 employees, independent companies and group subsidiaries, industrial, trading and service sectors[9] .

1.11 The main Open-Source ERPs

While there is various open-source ERP software that is widely used across industries, ERPNext is certainly one of the most popular and widely implemented systems that are developed with modern functionalities. ERPNext is aimed at small and medium businesses; offered as a series of apps. Based on MariaDB, ERPNext uses Python and JavaScript based server-side framework to offer exceptional features and user experience. The open-source ERP software enables businesses to actively track inventory across multiple warehouses, as well as, offer advanced functionalities to manage customer issues. Manufacturing businesses and SMEs are the biggest users of the system, which leverage the interactive interface and advance functionalities of the software to streamline business operations. To further enhance customer experience, ERPNext comes with an easy implementation process, whereby, customers are guided at each step of the implementation process [30].

1.12 ERP Cloud

For several years, the number of solutions available in the Cloud has increased considerably, whether simple management tools or more complex solutions such as ERP software. Why this enthusiasm for the Cloud? Is this really the future of ERP? Before explaining the characteristics inherent to the success of the Cloud, it is first necessary to define what an ERP Cloud is. An ERP Cloud is accessible on demand on the Internet via a Web browser, with an all-inclusive subscription including access license, implementation, maintenance and support. The ERP Cloud has several characteristics [34] :

- A lightweight infrastructure
- Resources available
- Quick updates
- Secure data
- Controlled costs

1.13 Examples of ERP

1.13.1 Oracle

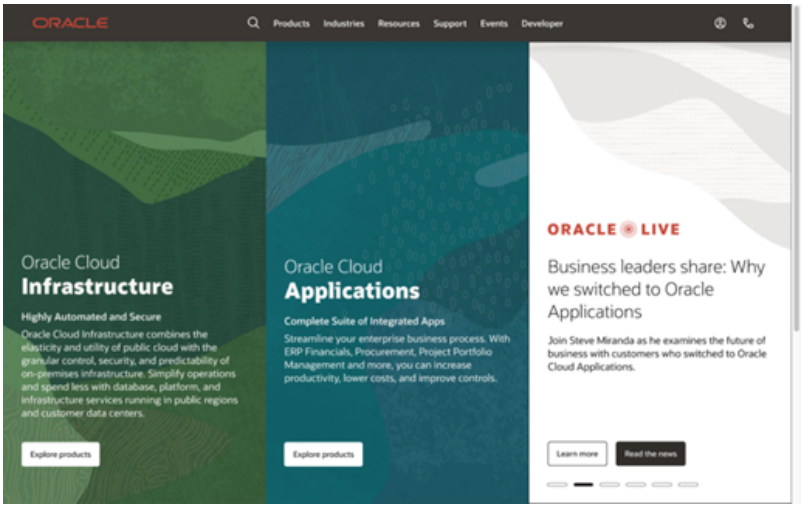

Figure 8: Oracle

Oracle ERP system is comprehensive software for managing business processes and functions, real-time reporting, business intelligence, and business decisions. Oracle ERP Cloud SaaS software provides advanced Generation 2 public cloud capabilities, including an advanced intelligent voice user interface (UI). Oracle continues to offer on-premises ERPsoftware [39] .

1.13.2 Sage

Figure 9: Sage

Enterprise resource planning (ERP) is a type of management software that integrates day-to-day business processes. It helps business leaders streamline company activity by connecting all data points and providing accurate business insights.

From HR and accounting to inventory management and customer relationship management (CRM), our enterprise software lets users share information across the entire business from a single, secure database. In short, it connects the dots, packaging data into one simple system [29].

1.13.3 Odoo

Figure 10: Odoo

Odoo ERP system is enterprise resource planning software used company-wide for the management of business processes. Odoo provides seamlessly integrated functional business apps called Odoo apps that form an ERP solution when combined. Open-source software, Odoo, is available with SaaS subscription pricing as the Enterprise edition or as the Odoo free Community version.

Odoo Enterprise edition is desktop or cloud-hosted Odoo Online, available anywhere and from any device. Mobile device operating systems include the Apple iOS and Google Android. Odoo Community version is available only as a desktop ERP solution and CRM. Odoo Enterprise has many more features.

People ask what Odoo means. As an acronym, Odoo stands for OnDemand (SaaS) Offer from OpenERP, according to a reference to a 2009 blog post in an Odoo forum. Others think Odoo means On Demand Open Object. Odoo started in Belgium as TinyERP, then switched the name to OpenERP before choosing Odoo for its company and open-source ERP software. [38].

1.13.4 Microsoft Dynamics

Figure 11: Microsoft Dynamics

Microsoft, one of the largest software companies in the world, sells an ERP called Dynamics 365. Their ERP is cloud-based and offers state-of-the-art solutions, such as customer relationship management (CRM), tools for AI, financial analytics, and productivity features. Dynamics 365 is compatible with businesses of all sizes, offering different pricing plans for varying needs. This is partly due to Microsoft's brand recognition, which gives them sales and marketing flexibility that other companies don't have. You can use Dynamics 365 for marketing, customer service, retail operations, human resources, project automation, and more. The company's software is created not only to provide essential financial data, but to enable better decision-making with that data [22].

1.14 Conclusion

We have seen in this part the basic concepts ,Benefits , Disadvantages of ERPs which helped us to have a general idea about the tool that we are going to introduce in the second chapter

Chapter Two

In this Chapter we will talk about Group Melouki with their modules and activities and Point of Sale from first appear to present.

2 Chapter Two : Group Melouki

2.1 Representing Group Melouki

Group Melouki is A Group Orgnized into 9 Activity in Algeria, M'sila, They Provide Services In : Software, Pharmacy, Analysis, Logistics, nutrition and beauty With over a 130 permanent employees, and this group started in 2006 by it is managing director Dr. Melouki Ahmed Salim This Group has a decentralized operating mode for each activity and autonomous, while working in synergic and progressing by sharing experience.

2.1.1 Activities Of Melouki Group

- **Melouki Pharmacy** : starting in 2006

Figure 12: Melouki Pharmacie

- **Melouki Laboratory** : 2012 this is the year of creation of the Melouki laboratory. The laboratory is part of the melouki group, one of the largest medico-pharmaceutical group in Algeria.

Figure 13: Laboratoire Melouki

- **MeloukiSante** : started in 2014 and it is specializes in the import of medical equipment and laboratory equipment as a main activity.

Figure 14: Melouki Santé

- **TechnicLab** : started 2013 is a Laboratoy equipement distribution company, Offre a wide and Varied range Of Quality.

Figure 15: Techniclab Algerie

- **ParapharmStreet** : started in 2015 and it is company of parapharmaceutical products and medical equipment that is always at the forefront of fashion by guaranteeing the new trends of products requested by all age categories.

Figure 16: Parapharm Street

- **M-BioLogistix** : started in 2017

Figure 17: M-Bio Logistic

- **M-formatik** : started in 2018 it is an IT service provider company, aiming to produce IT products and services to bring productivity and efficiency in the performance of customer activities.

Figure 18: Formatik

- **Logistix** : started in 2018

Figure 19: Logistix

2.1.2 The organizational chart of Melouki GROUP

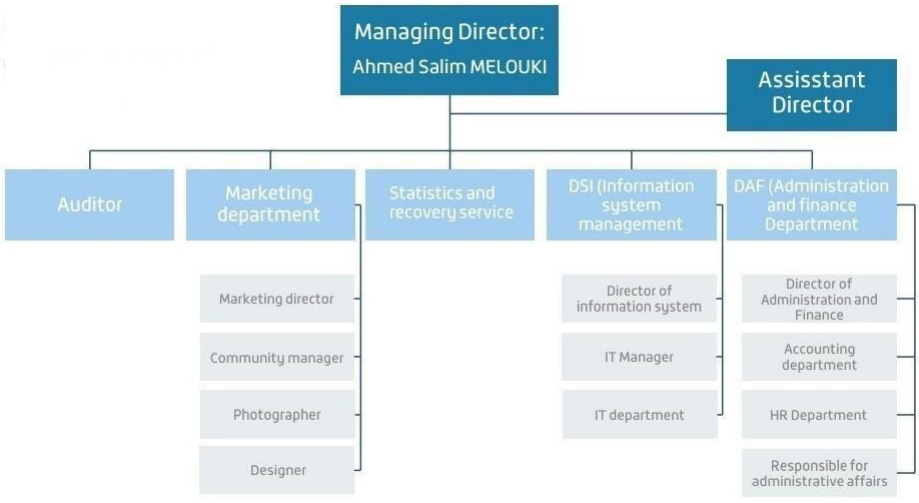

Figure 20: organizational

2.2 HISBA ERP

Hisba is an ERP platform which is developed in M-Formatik one of the companies in Group Melouki this project started in 2019 to handle and accelerate the workflow of the Group in first place and this project started because the unavailability of this kind of robust stable product in the local market. this ERP platform have many applications in different platforms Web, Mobile, Desktop build with many latest technologies available in the market. The main application in this ERP is the desktop application which is build with WPF framework of the .NET platform.

2.2.1 Hisba Modules

2.2.1.1 Hisba CRM

The goal of HISBA CRM is to manage the business of small offices, small and medium enterprises with inventory management, cash, production, tasks, reports and statistics.

- **Global Architecture**: Hisba CRM consists to 4 main areas of commercial which are Purchases, Sales, Stocks and Treasury, each one of the consist to areas and every sections performs a specific work to his area like the purchase there are purchase invoice, purchase quato, purchase order and goods recipt.

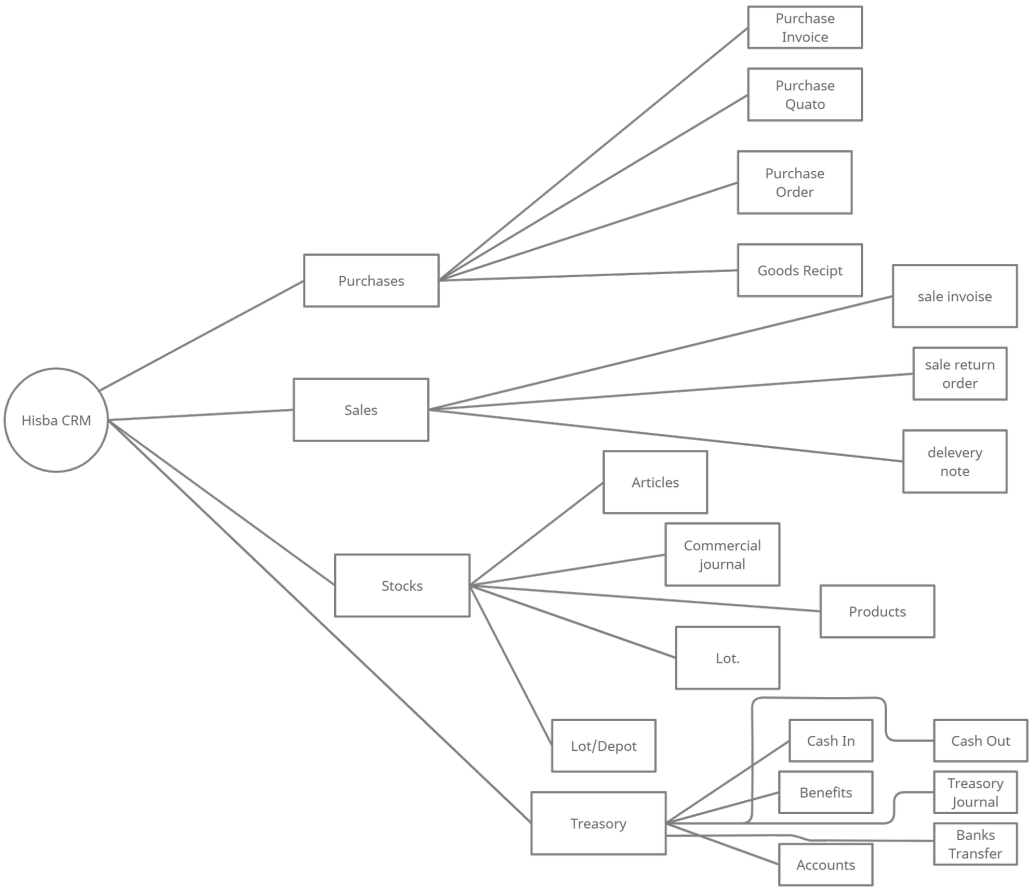

Figure 21: Hisba CRM Global Architecture

- **Software pictures**: In this figure we take screenshots to Commercial Journal which display all the purchase and sales operations.

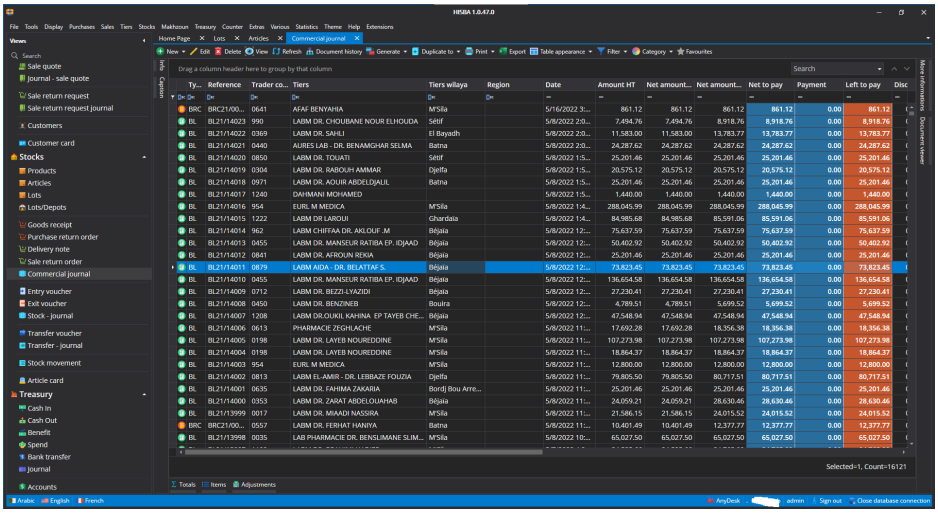

Figure 22: Commercial Journal

2.2.1.2 Hisba Makhzoun

Makhzoun is an extension of HISBA ERP which is an an integration of the connected operator concept in order to improve the system efficiency as follows:

- Optimize the mechanism of communication between your sales team and your stock team.
- Manage your inventory and benefit from a notification system that ensures your shopping is up to date and avoids high ordering rates.
- Share the information needed to prepare orders.
- Minimizing any risk of error (multiple preparations for the same arrangement, etc).
- Avoiding the receive customer complaints about the products received by solve all the future problems.

1. **Global Architecture**:
   Makhzoun consists to 3 principle areas to facilitate stock operation which are inputs, outputs and history. each one of the consist to areas and every sections performs a specific work to his area like synchronization there are delivery note, purchase return order and exit voucher.

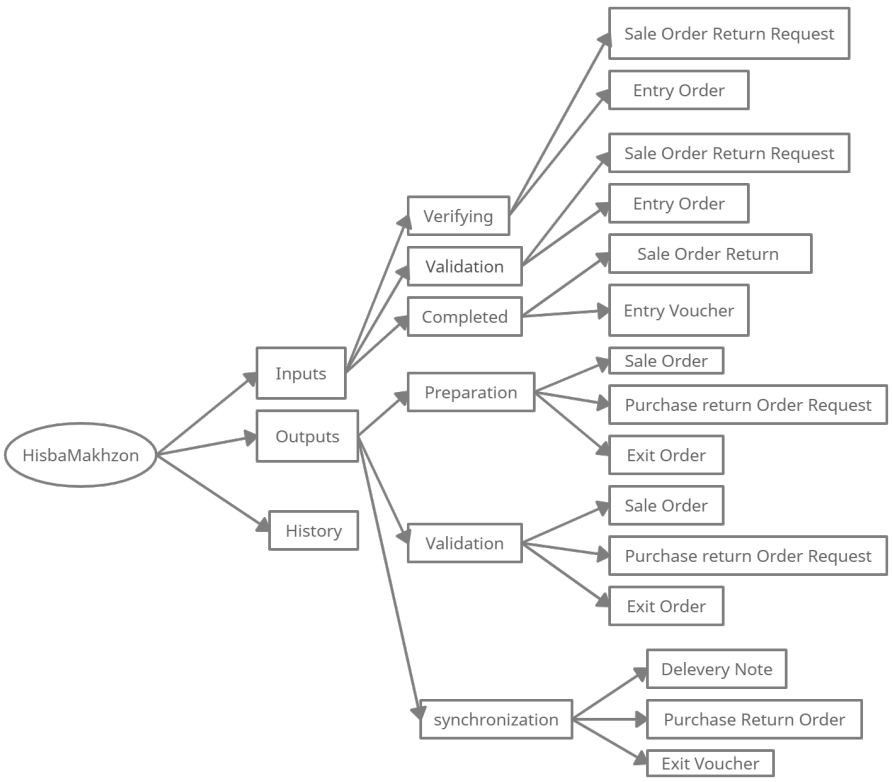

Figure 23: Hisba Makhzoun Global Architecture

2. **Software picture**: In this figure we take screenshots to Synchronization Delivery Note.

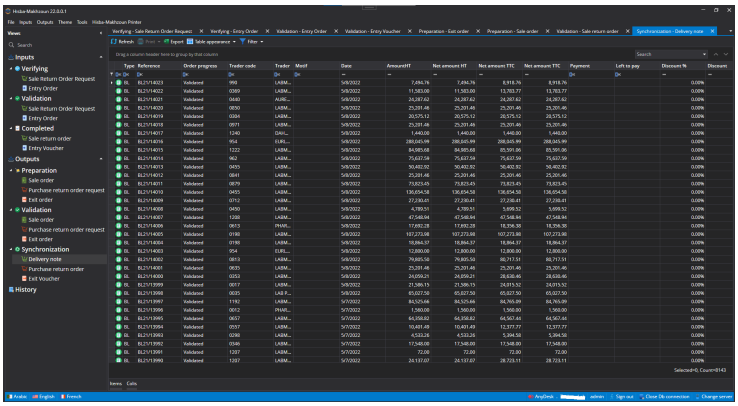

Figure 24: Synchronization Delivery Note

2.2.1.3 Hisba GO

HISBA Go its an extension of HISBA ERP its goals are to boost the turnover, increase the turnover rate of the stock and optimize the use of transport fleet according to the concept of direct distribution (door-to-door) and HISBA go also to allows to organize the whole procedure in one place and plan routes for the direct distribution of products and ship them to drivers. At the end of each tour all information is inserted into database simply from a simple click in the HISBA GO application of drivers.

1. **Global Architecture**:
   Hisba GO consists to 8 principle areas to facilitate stock operation which are tiers, depot, sellers,planning, treasury and map.

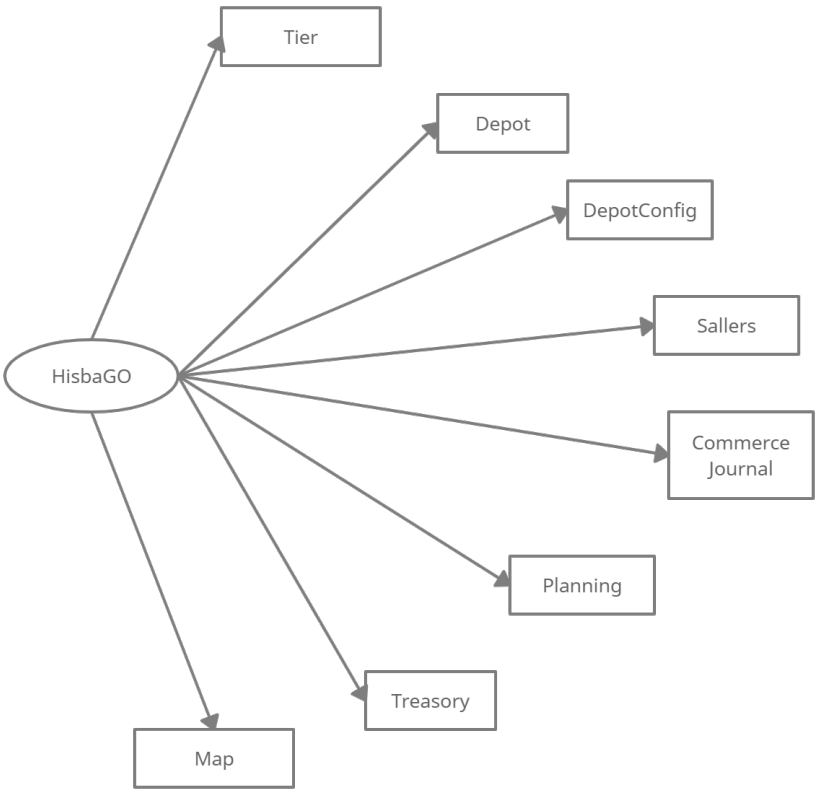

Figure 25: Hisba Go Global Architecture

2. **Software picture**: In this figure we take screenshots to Journal planning.

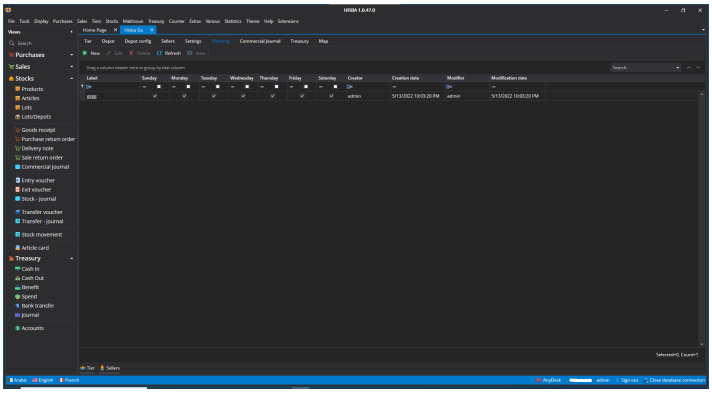

Figure 26: Planning

2.2.1.4 Hisba WooCommerce

Over time Habits and ways of doing things in almost all sectors of activity are revolutionized folows as using commerce sites, so HISBA has an extension for tak easy to cominicate between the commerce site and HISBA by syncrinize the data of the site to HISBA and then manage the received orders in a simple and organized way and avoid overcrowding in your physical point of sale.

1. **Global Architecture**: Hisba WooCommerce consists to 5 principle areas to facilitate fetch data from the WooCommerce site of the company which use the software which are new web order, cancelled orders, complete orders, all orders and clients.

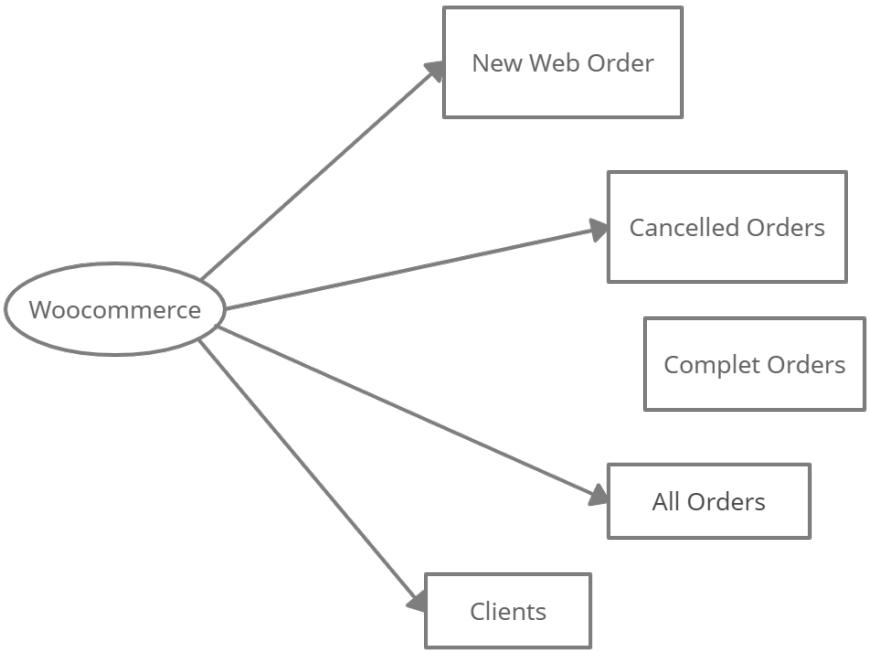

Figure 27: Hisba Woocommerce Global Architecture

2. **Software Pictures**: In this figure we take screenshots to all orders side.

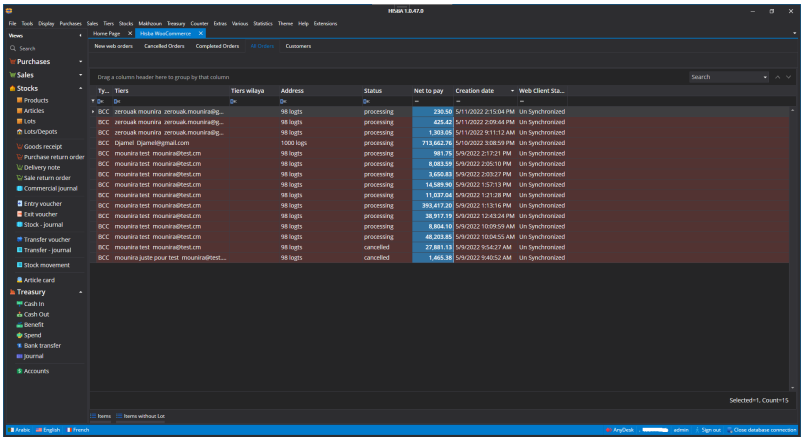

Figure 28: All Orders

2.2.1.5 Hisba Logistix

Logistics plays a crucial role for any company looking to secure its place in the distributor market. Logistix is a management tool that allows to trace the packages prepared from Makhzoun and follow the entire delivery procedure from the exit of your goods from stock until their arrival to customers step by step and in real time.

1. **Global Architecture**:
   Hisba Logistix consists to 2 principle areas to facilitate fetch data from the logisitx site which are new web orders and missions.

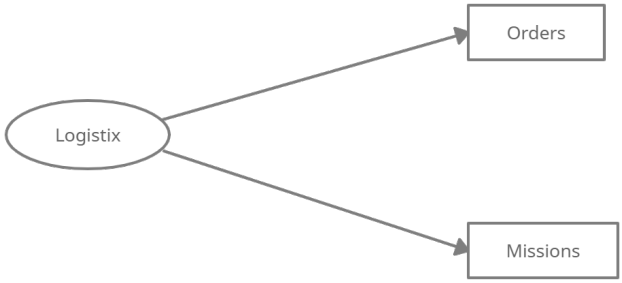

Figure 29: Hisba Logistix Global Architecture

2. **Software Pictures**: In these two figures we take screenshots to orders and missions.

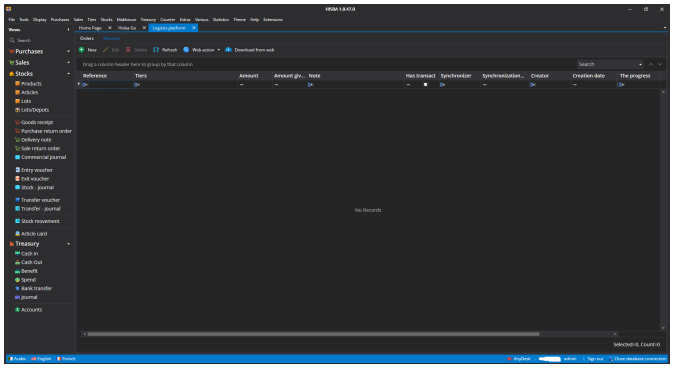

Figure 30: Missions

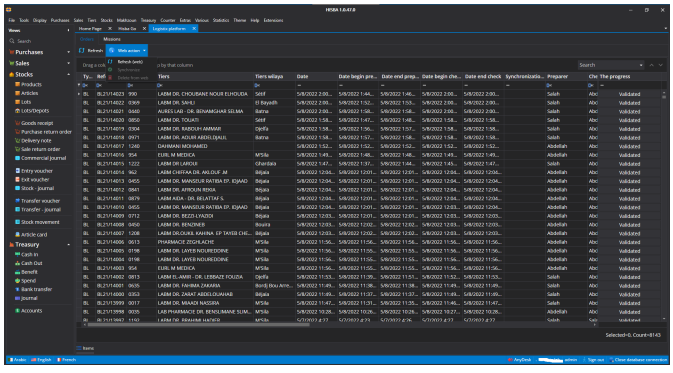

Figure 31: Orders

2.3 Point Of Sale (P.O.S)

2.3.1 Definition

The point of sale (P.O.S), an integral part of the point of purchase, refers to the location at which a customer makes a payment for goods or services and where sales taxes may become due. Usually, marketers place a high value on points of sale (P.O.S) because consumers frequently make purchases of high-margin products or services at these strategic locations. Historically, businesses placed P.O.S near store exits to increase the rate of impulse purchases made by departing customers. Diverse point-of-sale locations, on the other hand, can provide retailers with additional opportunities to micro-market specific product categories and influence consumers earlier in the sales funnel. Now, it can take place in a physical store, where point-of-sale terminals and systems are used to process credit card payments, or in a virtual sales point, such as a computer or mobile electronic device. The latter is usually an option for stores or businesses that do not have a physical store for holding such interaction with their customers [1].

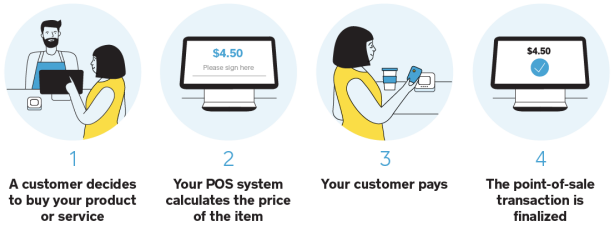

Figure 32: P.O.S

2.3.2 Architectural of P.O.S

Like we see in this figure the P.O.S architecture contains 4 main areas which are database, administrator, employees and printer.

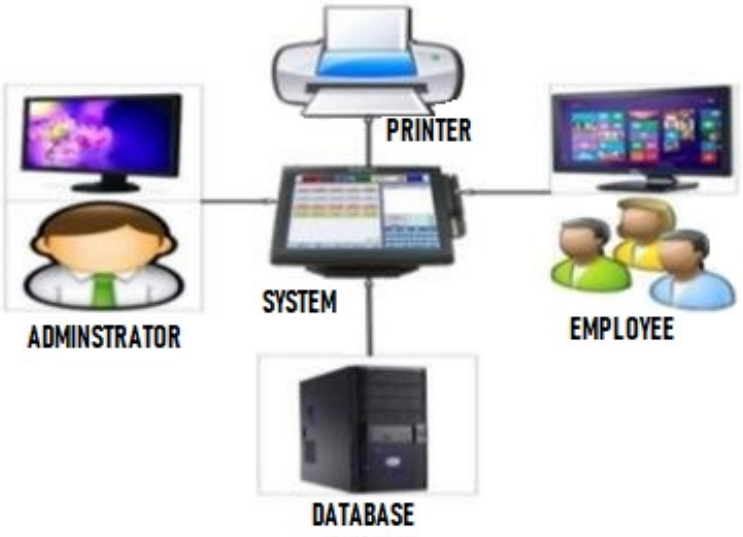

Figure 33: Architectural-of-P.O.S

2.3.3 History of Point Of Sale

Until close to the turn of the 20th century, businesses handled customers' purchases with paper and pen. The process was slow, mistake prone and offered little protection against fraud. That began to change when inventor James Ritty patented a mechanical cash register in 1883. The machine recorded each purchase at Ritty's saloon, enabling both customers and the owner to check every transaction. He later sold his invention to John Patterson, who would go on to found the National Cash Register (NCR) Company. NCR remains in business today and makes, among other products, P.O.S systems. About a century later, in 1970, IBM introduced an electronic cash register. This allowed businesses to ring up customers' purchases more accurately and quickly. In 2002, the first cloud-based P.O.S system was introduced in the United Kingdom. Over the past several decades, P.O.S systems have continued to evolve and advance. The features offered by today's systems dramatically improve many businesses' operations [5].

2.3.4 Point Of Sale Benefits

- **Real-time Data Accuracy**:
  One of the highlighted advantages of integrating ERP and P.O.S systems is ensuring the business data is updated in real-time, as well as, eliminating unexpected errors from manual data entry across functions within a company. It can be a serious issue if the data from the two systems are in different formats. This type of integration will assist employees to transfer information among departments much more easily and accurately. For example, when figures are adjusted in the P.O.S platform, the ERP system will automatically update accordingly. This feature makes it possible for employees to keep track of every single activity, at the same time giving them more capability to generate higher revenue [35].

- **Inventory and Distribution Management**:
  ERP and P.O.S integration is also beneficial for retail businesses in inventory and distribution management. In detail, the two systems allow businesses to get overall visibility of their whole operations including sales, stock, inventory and capital budget. This aids the organisation's managerial level to make critical decisions based on those important figures. For instance, after a front-end salesperson sells a number of items and makes changes in the P.O.S system, the information will be updated in real-time and the back-end office inventory manager will immediately be able to see the updated changes. In the case of low inventory, the ERP system will remind managers when to stock up; providing alerts when inventory is approaching their safety stock level. The ERP system may be effectively used as a tool for forecasting and improving seasonal inventory orders based on historical data, hereby meeting businesses' constraints of time, budget and space [35].

- **Customer Satisfaction Enhancement**:
  Another benefit of the combination of ERP software and the P.O.S system is significantly enhancing customer satisfaction by giving them various choices and pleasant experience. First and foremost, by integrating a cloud-based ERP platform and a P.O.S system, businesses can offer their customers more favorable choices of purchase. Beside business models such as brick and mortar, click and mortar, information synchronisation in P.O.S and ERP system can serve to operate bricks and clicks, which allows customers to order online and pick up in-stores. Furthermore, the sales staff is also able to instantly access customer's information which aids in efficiently closing the deal. Salespeople may also require customer's data resources and their purchasing histories to provide more suitable recommendations, enhancing customer's pleasant experience, by that means, contributing to up-selling and cross-selling boosts [35].

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2.3.5 Common P.O.S software features

P.O.S software is like your command center. At a basic level, it allows you to find items in your library and ring up sales. More robust point-of-sale solutions also feature helpful tools such as sales reporting, customer engagement software, inventory management, and more. P.O.S systems also take care of routing funds to your bank account after each sale, here mentions some of common P.O.S's features [8]:

- **Payment processing**: Payment processing is one of the core functions of a P.O.S system. Each time a customer buys an item, your P.O.S system processes the transaction. There are a number of different payment types a P.O.S system might accept:

  - Cash.
  - Secure online payments through your ecommerce site.
  - Credit cards, which are cards that you swipe.
  - Chip cards, which are credit cards with an embedded chip
  - Contactless payments, which might include a contactless card that customers tap or a mobile wallet (e.g., Google Pay or Apple Pay)
  - o Card-not-present transaction, which happens when your customer and their credit card aren't actually in front of you, so you have to manually enter their credit card information. This also occurs when a customers enters their payment details while checking out online.

- **Inventory management**: Inventory management software allows you to keep tabs on all your products. Some automated inventory software can connect with your sales data and let you know when an item is running low.
- **P.O.S Reports**: P.O.S reports give you a quick look into how much you're selling and earning. With clear reports, you can sell more and make better business decisions.
- **Employee management**: Team management software lets you know when your employees are working and how they're performing. Your team can also use it to clock in and out, and some types of software can grant permissions so employees can get access to certain tasks.
- **Customer relationship management (CRM)** : A CRM tool that's tied to P.O.S software lets you see what your customers bought and when they bought it. This knowledge helps you personalize your communications, marketing, and customer service.
- **Receipts**: Receipts make processing refunds easier, since there's a digital or paper trail connected to the purchased item. They can also make your business look more polished.
- **Tipping support**: For restaurants and service professionals, tips can be a big part of getting paid. P.O.S solutions that allow customers to add a digital tip during the checkout process, make it more likely that they'll tip .

2.3.6 Software components of a P.O.S System

These are the common physical components required to get your P.O.S up and running:

- **Monitor/tablet**: Displays the product database and enables other functions, such as employee clock-in and viewing sales reports. Tablets—especially iPads—are popular for replacing bulkier monitors.

Figure 34: Monitor

- **Barcode scanner**: Automates the checkout process. Scanning barcodes pulls product info and adds it to the checkout total. Barcode scanners can also integrate with inventory management systems to automatically adjust stock levels.

Figure 35: Barcode

- **Credit card reader**: Since the EMV payment standard went live in 2015, secure and EMV-compliant credit card readers are a must-have. Non-compliant retailers face potentially huge losses on account of fraud liability.

Figure 36: Credit Card Reader

- **Receipt printer**: Email and text receipts may be gaining popularity, but paper receipts remain essential for providing customers with a quick snapshot of their purchase or returns.

Figure 37: Receipt Printer

- **Cash drawer**: It may fade away in years to come, but cash is still king. Until then, you'll need a secure place to store cash for transactions. Another benefit of cash: there are no associated credit card fees .[33]

Figure 38: Cash Drawer

2.3.7 How to buy the Best P.O.S System

There is no single point-of-sale system that will be the best option for every company. But You need to ask your self the following questions can help you choose one that works for your organization [**BuyingPOS**]:

1. How does the P.O.S system sync your online and retail store? According to the National Retail Federation, 6 out of 7 consumers research products online before buying in a brick-and-mortar store and there's little doubt that retailers selling both online and in-store bring in significantly more revenue than those who sell via one channel alone. Imagine a store that never closes – that's the power of running an omnichannel retail operation. The right P.O.S helps brick-and-mortar retailers build online stores and sell through any channel.

2. Does the P.O.S system empower your staff? Customers have every resource at their disposal, from the internet to their friends and family. Often, before actually coming into a store, they have already conducted their research and are loaded up with questions to ask — ready to come in and get out. Retail employees need to feel as informed as the customers they work with, and smart mobile technologies are the way to accomplish that. A good P.O.S system shouldn't eat up employees' time or make them want to pull their hair out. It should offer them the information they need, immediately, so they can serve customers and move people through the store. They're the ambassadors of your brand – don't leave them out of the equation when you consider your store's technology.

3. Are training and support included? People are different. Retailers are different. The principles may be the same, but each store and employees have differences and come with their own preferred workflows, challenges, preferences, requirements and goals. A good P.O.S vendor helps you figure out if the software fits your needs (if it will help your store succeed) and will help you with onboarding sessions as well as offer technical support for those times when something just doesn't make sense. You shouldn't be left alone as soon as the purchase is made, so always make sure to ask about what kind of post-sales support your vendor offers

4. Does the P.O.S system offer reporting and analytics? Retailers used to fly blind – goods came and went, but business managers had only a vague idea of profits. Times have changed. In today's highly competitive environment, retailers can't afford to take risks. That's why a good P.O.S will show you how well you're doing, and where you can improve.

5. Can the P.O.S system enable help you to run targeted marketing campaigns? Research has shown that fewer than 1 in 10 new prospects will make a purchase, while more than 6 in 10 existing customers will buy again. As a result, today's leading marketers are no longer sending out generic email blasts – they're crafting consumer conversations and pinpointing what their customers actually want to know about. The right retail P.O.S system helps improve relationships with your shoppers and send relevant communications tailored to your customers' preferences.

6. Will the P.O.S system support your business' growth? When it comes to buying technology, think about the long-term costs and what you may need in the future. While it can be tempting to go for the cheapest and simplest system when you're getting started, you'll regret it when you outgrow it in a year's time. Retailers need scalable systems that can grow as their business does .

2.3.8 P.O.S with Cloud

As cloud-based P.O.S systems explode in popularity across retail and hospitality industries, learn what these innovative payment processing systems are and how they can help your business.

With payment technology evolving at eye-popping speed, consumers continue to be bombarded with a variety of different payment options at retail operations. The invention of some of the best cloud P.O.S systems(opens in new tab), or web-based point-of-sale systems ever seen, allows retailers to provide a variety of payment platforms easily and from the same device, minus the hassle of an old-school cash register.

With the variety of options for modern-day cloud P.O.S systems, it can be a headache for business-owners to understand which option they should choose. TechRadar breaks down the benefits of top-rated cloud-based systems in this article

TechRadar also states that a recent study revealed that 50/100 of consumers globally prefer could-based payment methods versus the hassle and inconvenience of carrying cash. This leads to higher customer satisfaction, and opportunity to build retention, gather valuable data, and upsell additional products or services. [12]

Figure 39: P.O.S Cloud

2.3.9 P.O.S System Examples

Popular P.O.S examples include Shopify, Lightspeed, Vend, Magestore, etc. The top five P.O.S systems which are helping retailers achieve their business goals and help them in carrying out their daily tasks in a productive manner are listed below:

1. **Square**
   Square has a variety of P.O.S options to help you take yours where you want it to go. Whether you run a restaurant, sell retail goods, book appointments, or just need a versatile P.O.S for whatever comes next, we have the point-of-sale software that will best support you and your unique business needs. The key features of this highly reliable Point of Sale brand include [32]:

   - Detailed customer profiles
   - Detailed reports and analytics
   - The staff permissions are unlimited
   - High performance

Figure 40: Square P.O.S

2. **Lightspeed P.O.S**
   Launched in 2013 by Dax Dasilva in Montreal, Quebec, Lightspeed started as a retail P.O.S, then added its restaurant and golf software, as well as other tools and platforms, over the following years. Today, Lightspeed P.O.S Inc. employs more than 900 employees across more than 10 offices worldwide. Lightspeed provides its services to 51,000-plus customers in more than 100 different countries; notable big-name companies include Sony, Goop (Gwenyth Paltrow's lifestyle brand), and the Five Guys fast-food chain. In 2019, Lightspeed acquired Kounta, Chronogolf, and iKentoo – all P.O.S systems added to enhance the company's offerings. Following those acquisitions, Lightspeed added the comprehensive hospitality P.O.S features of Gastrofix to its loaded arsenal of tools in 2020.[19]

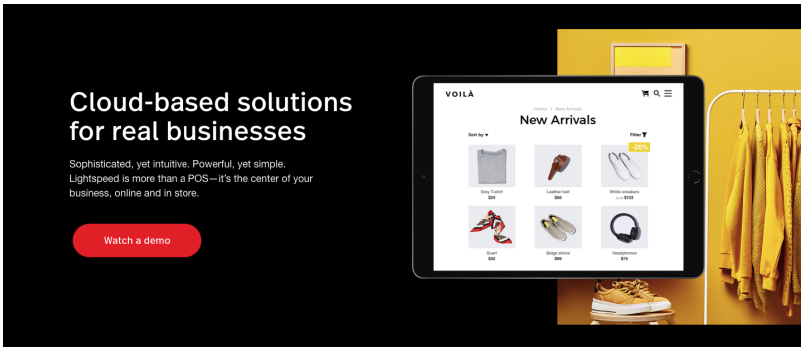

Figure 41: Lightspeed-P.O.S

3. **Shopify**
Shopify is one of the top point of sale systems for integration with e-commerce-based retailers and stores. The P.O.S clients of this amazing brand are provided with their own online store. They can also manage their products online and reach out to people through various channels like social media, etc. The additional

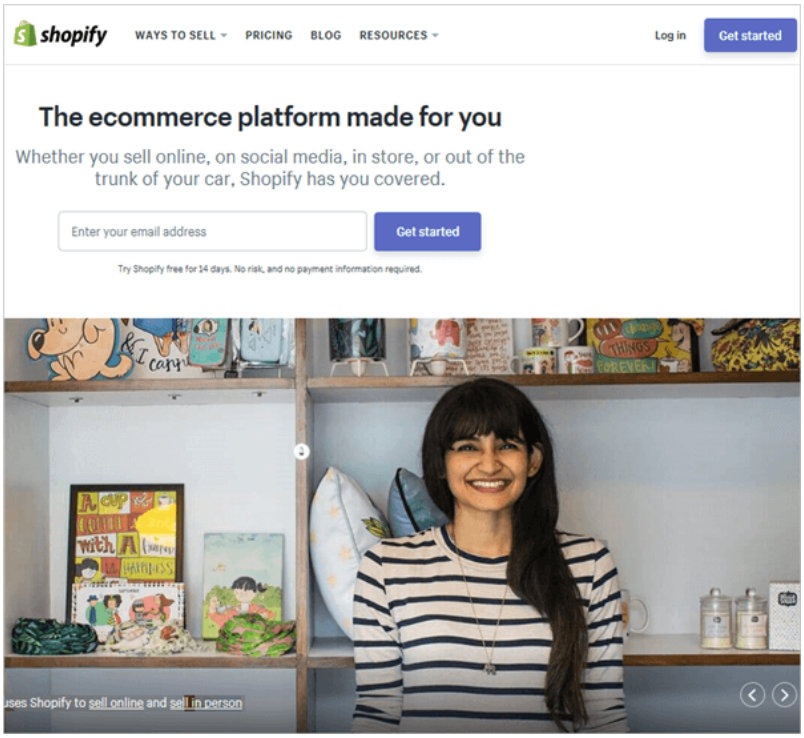

Figure 42: Shopify

features include sales and purchase inventories, employee management and profiles, daily and weekly analytics, discount codes and offers, and a mobile-based application to support the users. The support team is also available 24/4 through different channels such as email, live chat, and phone.

The prominent features of this amazing P.O.S service provider include the following [31]:

- Online store
- Amazing discount offers and codes
- A free mobile application on Apple store

4. **Vend P.O.S**
   Next, we would like to introduce Vend — another P.O.S example that is famous for its efficient third-party integrations and other amazing features. Additional modules embedded in this system also include payment processing modules, sales, and inventory management systems, customer profiles, split payments, amazing offers, and gift cards, payments with contact information, e-commerce integrations, etc. All these amazing set of features can help the stores in making seamless sales through several channels such as digital, physical, and mobile [24].

Figure 43: Vend-P.O.S

Other prominent features include:

- Highly useful e-commerce features
- The offline mode helps users in managing data without an internet connection
- Support for iPad, Mac, and PC.

5. **Magestore P.O.S**
   Magestore P.O.S is rich in all the features which are needed in a good Point of Sale system enabling retailers to keep track of all the activities going on around the store.

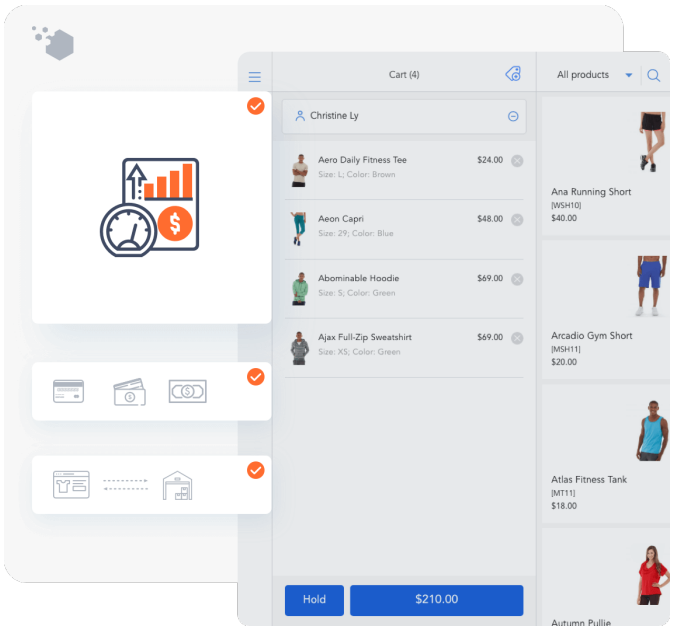

Figure 44: Magestore Magento P.O.S

The key features include [25]:

- Speed up your revenue generation with our robust and seamless P.O.S system.
- Intuitive and easy to understand user interface
- Convert your sales easily with the help of our amazing sales modules
- Manage your inventories and keep track of all the minute details related to sales and purchases.
- The processing of sales and purchases involving any number and category of products is accurate and error-free.
- The performance of our amazing Point of Sale remains fast and stable even during offline hours and the data is synced properly once the mode changes to online.
- The loyalty program makes sure that no offer or discount is wasted.
- Inventory keeps track of your stock flow across all sales channels and locations. Ensure the right stock in the right place anytime.
- Users can check out both as a registered user or guest as well.

2.4 Conclusion

In this chapter, we dealt with the establishment of Group Molouki company and the activities that it carries out, in addition to the components of the Hisba ERP system and we define Point of Sale (P.O.S) system.

Chapter Three

In this Chapter we will talk about the objective of this work and present the software with Uml language and show some screenshots.

3 Chapter Three : Analysis and Design

3.1 Introduction

This chapter will first consist in analyzing the Current problems of the system Hisba Through observation, we find that many users of Hisba logicels complain about the slow sales process, since the Hisba program has witnessed a great development recently, so it has become more complex,So in the second part we will try to provide a solution to this problem through P.O.S system.

3.2 problematic

Figure 45: Problem Solution

Merchants sought to improve sales and reduce bills , they have invested a lot of money to control, manage and organize their business through the programming of this system (HISBA), and they have always sought to obtain a system for the company, unlike in the past they used to rent a system at a high price In our study we found a lot of bad practices in Store management We quote some notes:

- slow in sales.
- Lack of company privacy.
- Poor traceability and lack of stored information.
- Risk of error when transmitting information.
- The impossibility of making detailed statistics.
- Decentralization of control.
- Lack of data necessary to make the right decision.
- Wasting a large amount of money.
- Lack of good coordination between different departments.

3.3 Objectives of work

1. Manage your inventory The primary goal of P.O.S Systems is to help manage your business inventory. During sales, most payments will be made by cash. Most systems use barcodes to track, receive, and sell inventory products. I will enable the P.O.S system you use to collect all this data and use it.

the P.O.S system will be able to do it for you. Through tracking and information gathering, the system can know what is selling the most and when it needs to be restocked. You will also get reports that will help you determine when you need to adjust your prices.

2. Automation of accounting Traditionally, you had to do the reporting manually at the end of each working day. Aside from wasting a lot of your time, you're also likely to make a mistake or two. The other important goal of efficient P.O.S Systems is to help simplify record keeping and accounting.

A point of sale system is more advanced and uses the information it collects to simplify the accounting process. You will be able to get all the data you need directly from your system. You can clear record transactions, collect taxes, and even manage sales using a good point-of-sale system connected to a computerized accounting system.

3. Collection of customer data Finally, you can use your P.O.S Systems to collect information from your current customers. This will mainly depend on the information capture capabilities and software used in the P.O.S system you are using.

With personal information such as customers' phone number and email address, you can improve their shopping experiences. Plus, having customers' credit card information on your system will make it easier for them to shop. This will encourage customer retention mainly due to the convenience of transactions.

3.4 Conception

3.4.1 General class diagram

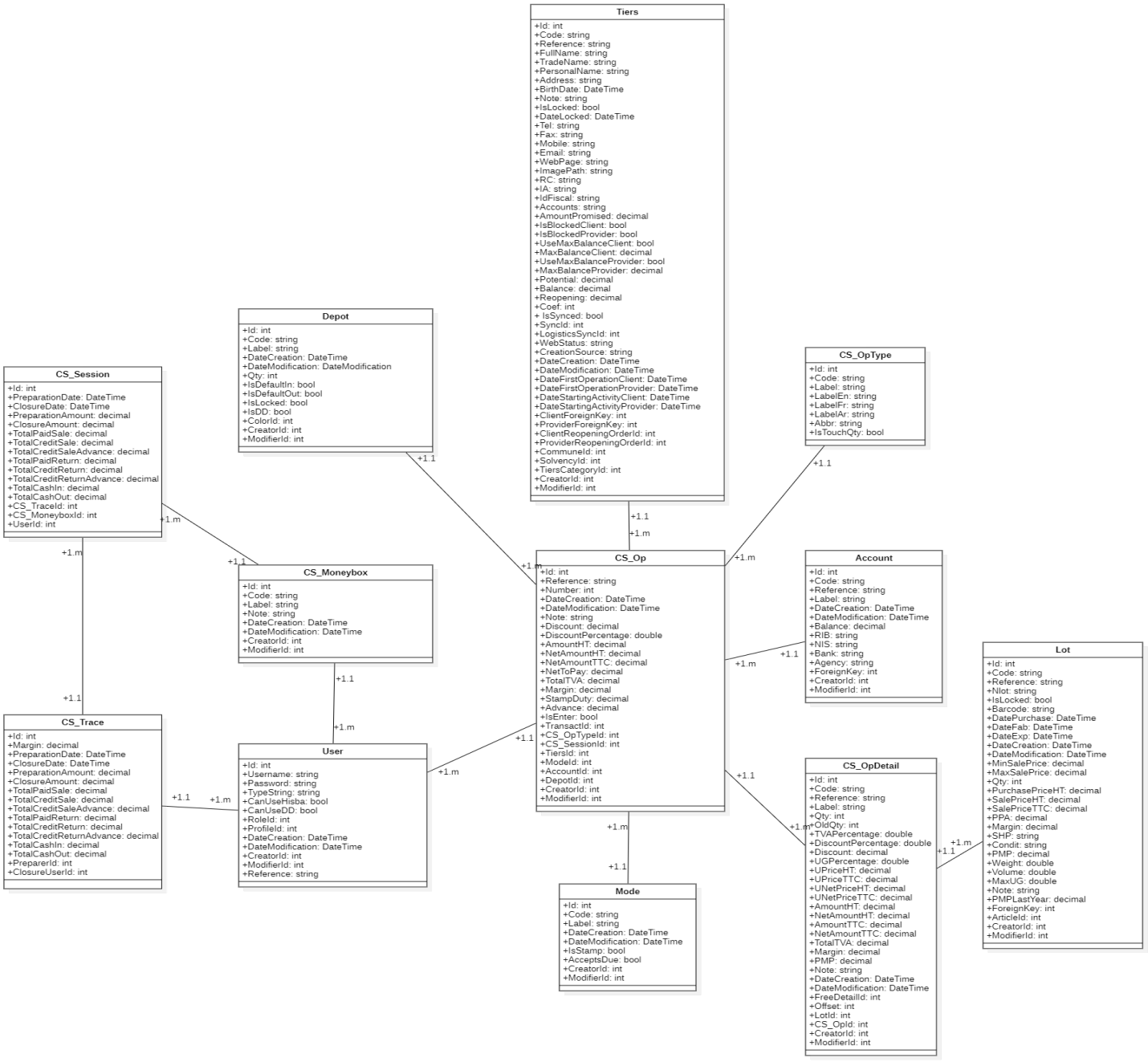

Figure 46: Class Diagram General Case

3.4.2 General use case diagram

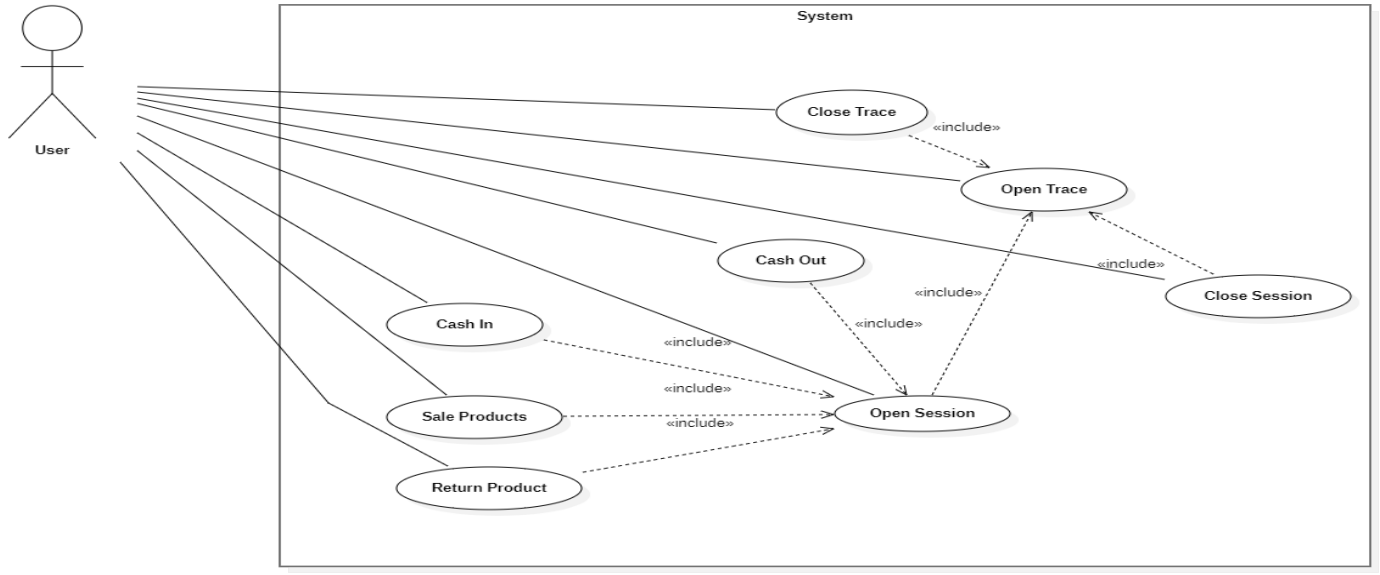

Figure 47: General use case diagram-Part 1

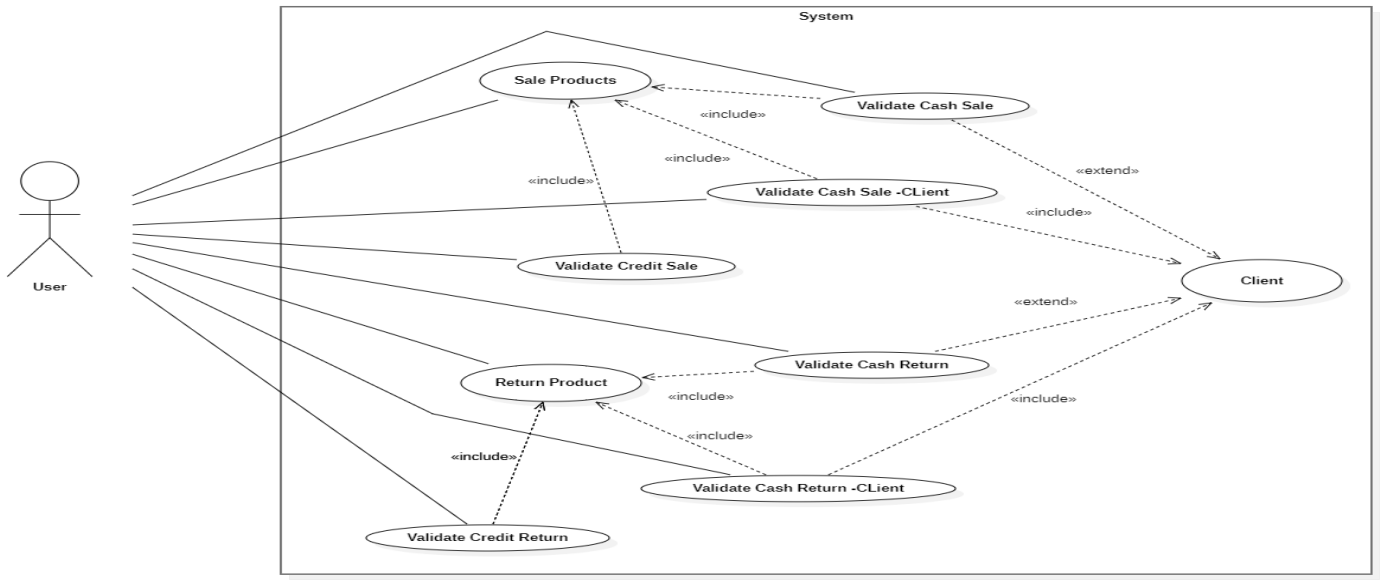

Figure 48: General use case diagram-Part 2

3.4.3 Tasks

3.4.3.1 Configuration

1. **Open trace**:

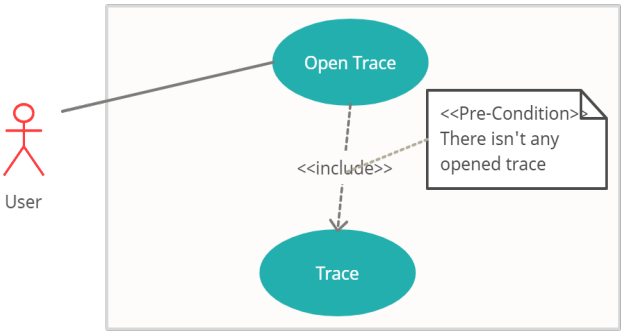

Figure 49: Open trace - Use Case Diagram

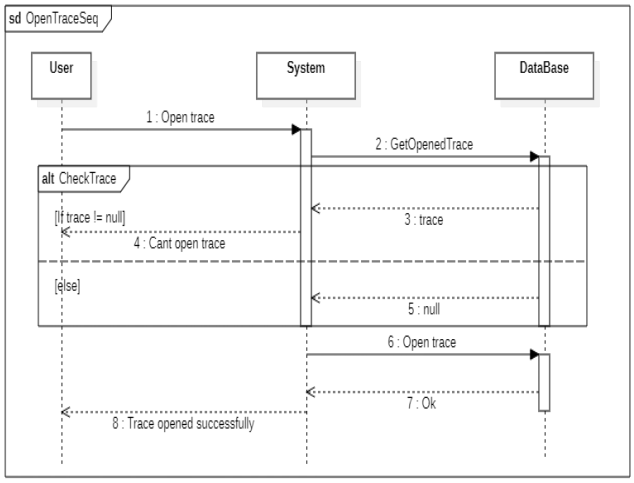

Figure 50: Open Trace - sequence diagram

Title	Open Trace
Actor	User
Description	The first thing the user need it to sell products or return the products he sold is open a trace, the goal of tracking in our system is to keep track of all these things or processes that happened.

Table 1: Open Trace

2. **Close trace**:

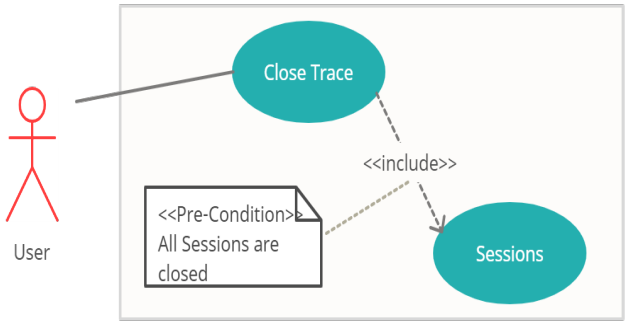

Figure 51: Close Trace - Use Case Diagram

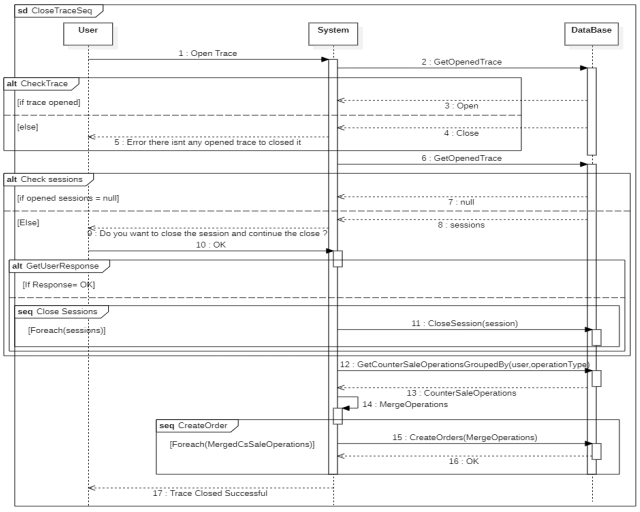

Figure 52: Close trace - use case diagram

Title	Close Trace
Actor	User
Description	To close the trace successfully the user need to close all the opened sessions if there are.

Table 2: Close Trace

3. **Open Session**:

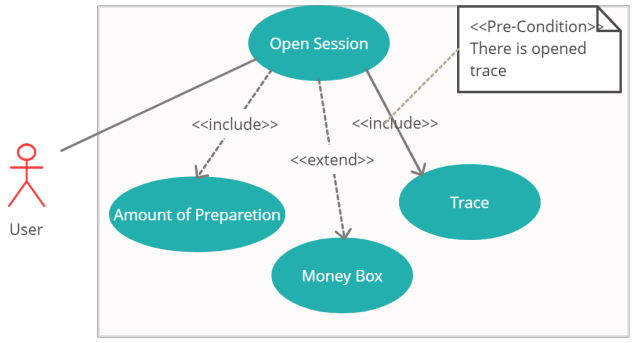

Figure 53: Open sessions - Use Case Diagram

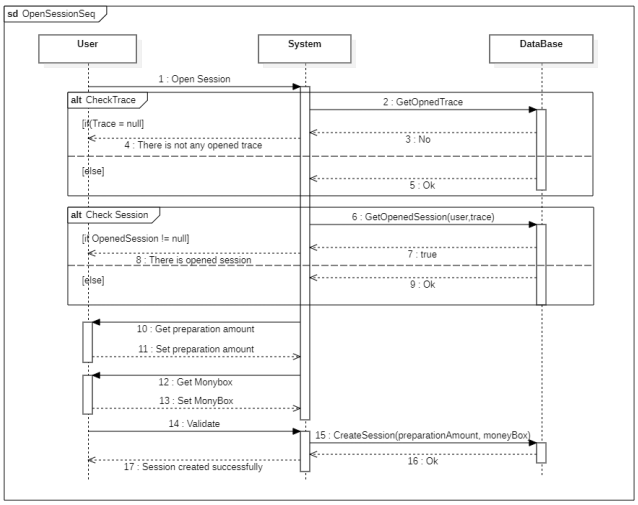

Figure 54: Open session - sequence diagram

Title	Open Trace
Actor	User
Description	To open the session its required an opened trace, the session level is less then trace so the objective of it is track the sellers and their sales from the first initial of the moneybox to finish work, so the user need to define the preparation amount of the moneybox and choice the moneybox to use.

Table 3: Open Session

4. **Close session** :

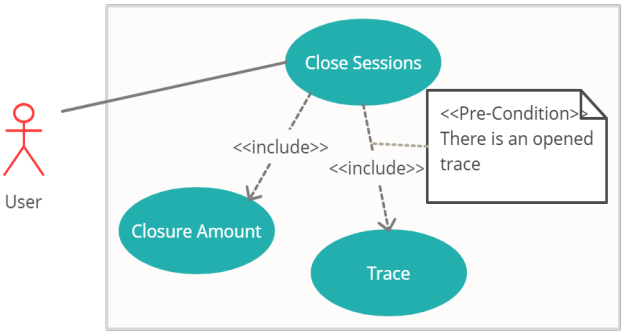

Figure 55: Close Session - Use Case Diagram

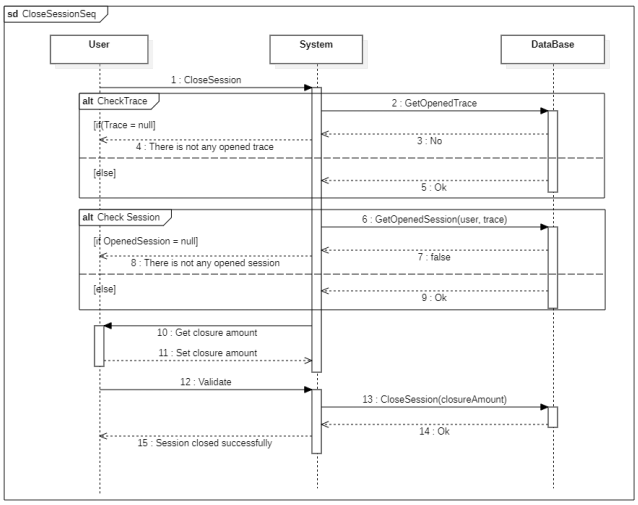

Figure 56: Close Session - Sequence Diagram

Title	Close session
Actor	User
Description	To close the session successfully the user need to calculate the amount of the moneybox that he worked with it and fill it in the system to close the session.

Table 4: Close session

3.4.3.2 Treasury

1. **Cash In**:

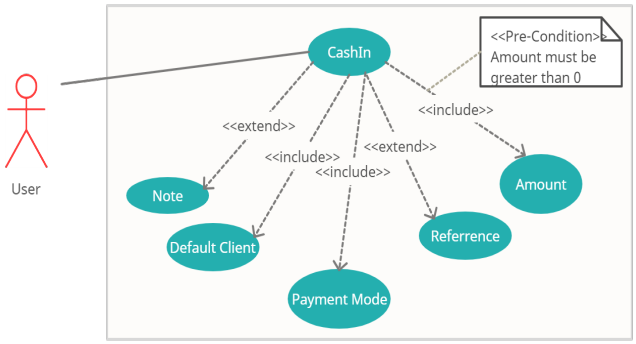

Figure 57: Cash In - Use Case Diagram

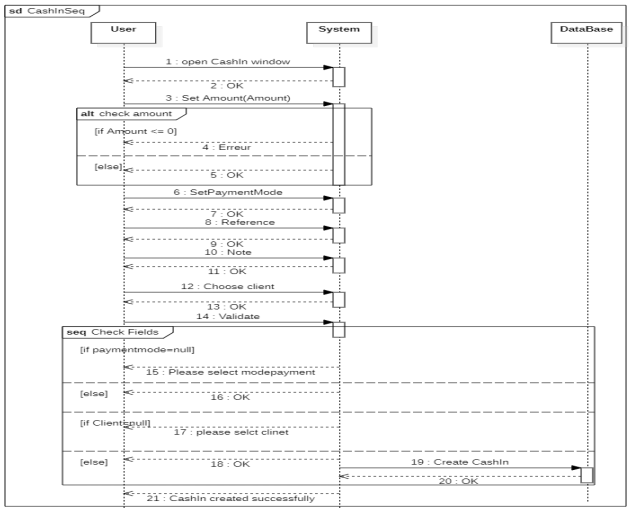

Figure 58: Cash In - Sequence Diagram

Title	Cash In
Actor	User
Description	The goal of the Cash In operation is to select the amount you received and add it to the cash box, so the user needs to define the amount, choose the payment method and fill out the note.

Table 5: Cash In

2. **Cash Out**:

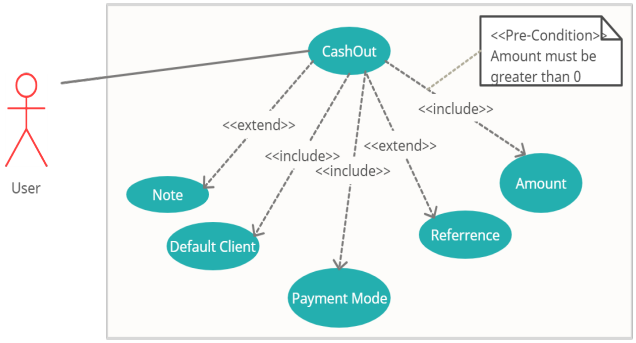

Figure 59: Cash Out - Use Case Diagram

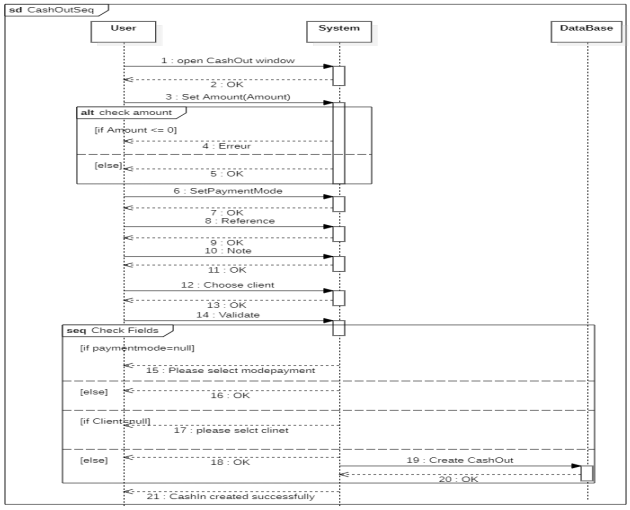

Figure 60: Cash Out - Sequence Diagram

Title	Cash Out
Actor	User
Description	The goal of the Cash Out operation is to select the amount that you gave it and Withdrawing it from the cash box, so the user needs to define the amount, choose the payment method and fill out the note.

Table 6: Cash Out

3.4.3.3 Sale operations

1. Select Products in Sale:

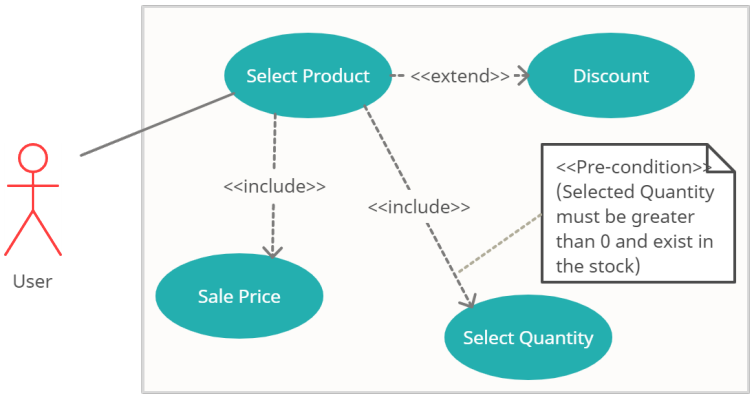

Figure 61: Select Products in Return - Use Case Diagram

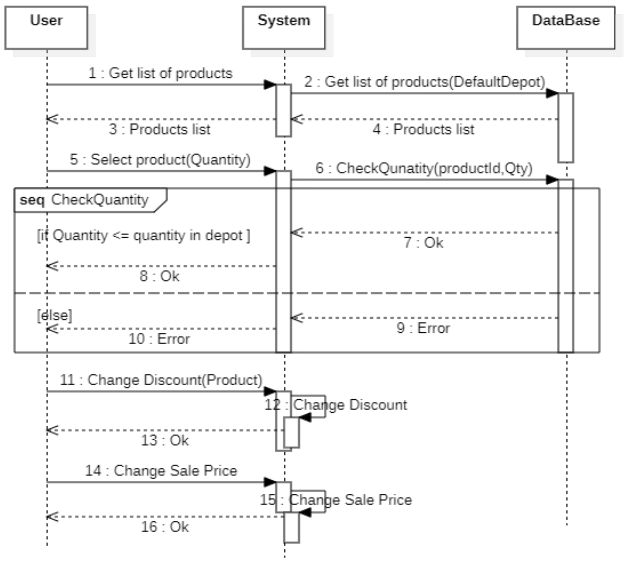

Figure 62: Select Products in Sale - Sequence Diagram

Title	Select products in Sale
Actor	User
Description	Like we know we can not do a sale without products so to select a product the user need to choose a product from combo box that contain a products and enter a valid quantity (equal or less than the quantity in the depot)what the client want to buy of the select product. The user can define another options like add discount to the product and change the sale price, all of this options he can find it in the settings. After that he can to validate an operation.

Table 7: Select products in sale

2. Validate cash sale Operation (Default client):

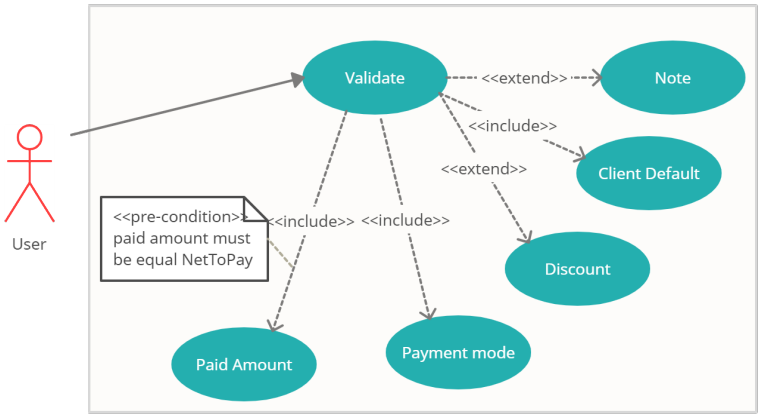

Figure 63: Cash sale (Default client) - Use Case Diagram

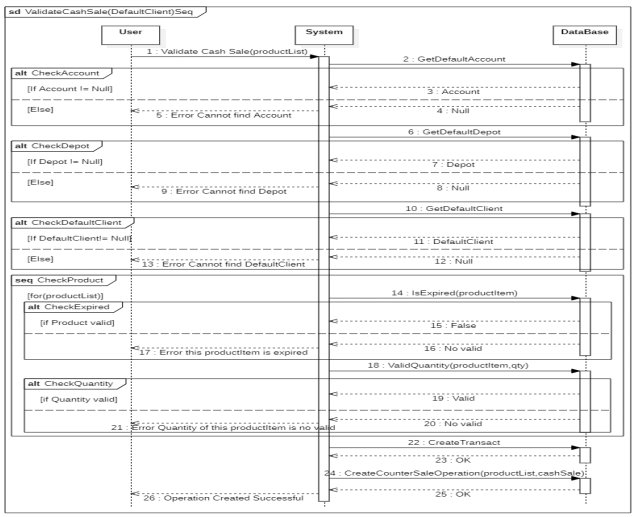

Figure 64: Cash sale (Default client) - Sequence Diagram

Title	Validate Cash Sale (Default client)
Actor	User
Description	This case must be made by the user when he wants to make a paid sale to an unknown customer, he need three important things to do they before validate cash sale operation are : • Open a session if it is closed. • There are products to sell. • Make sure to select the default client in the settings. After doing these three important things, he fills in the discount field if he wants to, but the discount ability must be enabled in the settings, after that he has to click the validate button. **Note:** this operation will be created under the default client.

Table 8: Validate cash sale (Default client)

3. Validate cash sale Operation (Client):

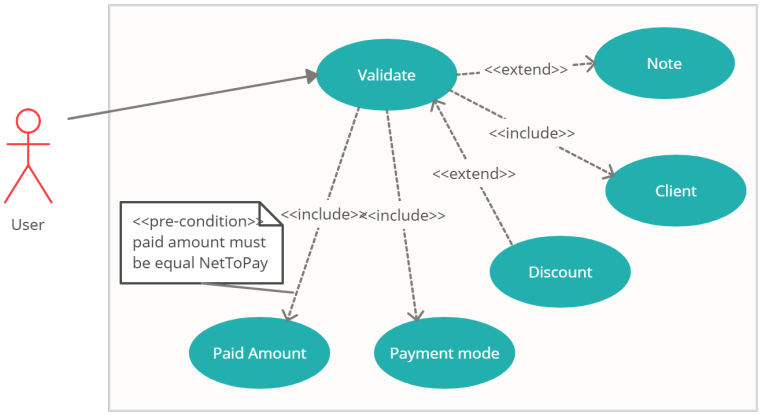

Figure 65: Cash sale (Client) - Use Case Diagram

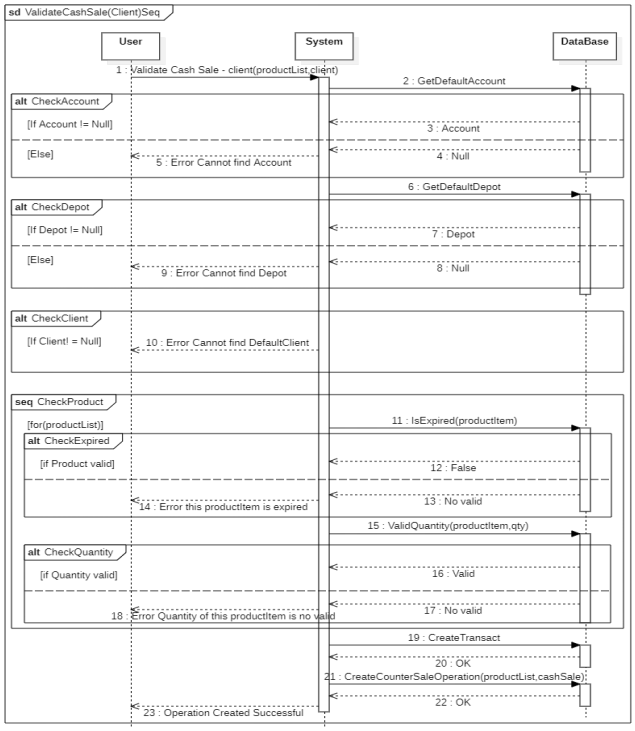

Figure 66: Cash sale (client) - Sequence Diagram

Title	Validate Cash Sale (Client)
Actor	User
Description	This case must be made by the user when he wants to make a paid sale to known customer, its the same with cash sale operation but the two difference are the client and the paid amount he need to enter them so there are important things he need to do before validate cash sale operation are : • Open a session if it is closed. • There are products for sale. • Select the customer from the Combobox that contains list of client. • Insert the paid amount After doing these important things, he fills in the discount field if he wants to, but the discount ability must be enabled in the settings, after that he has to click the validate button, after that the system if it found the paid amount less than net to pay it will change the type of this operation to Credit sale.

Table 9: Validate cash Sale (Client)

4. Validate credit sale operation :

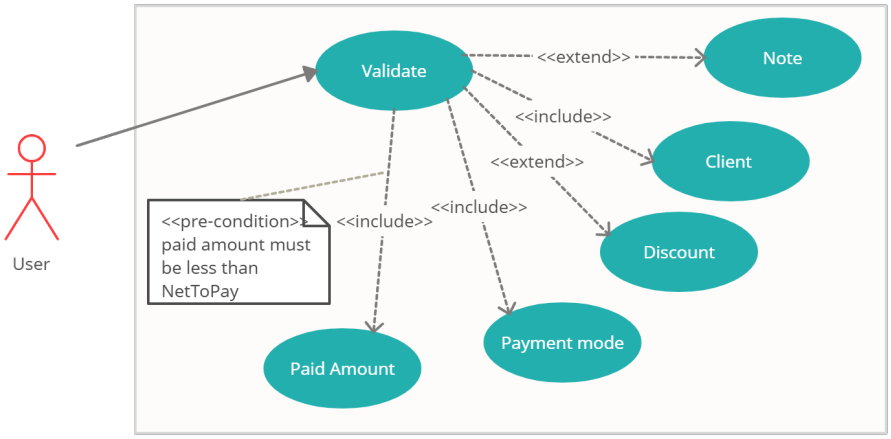

Figure 67: Credit sale - Use Case Diagram

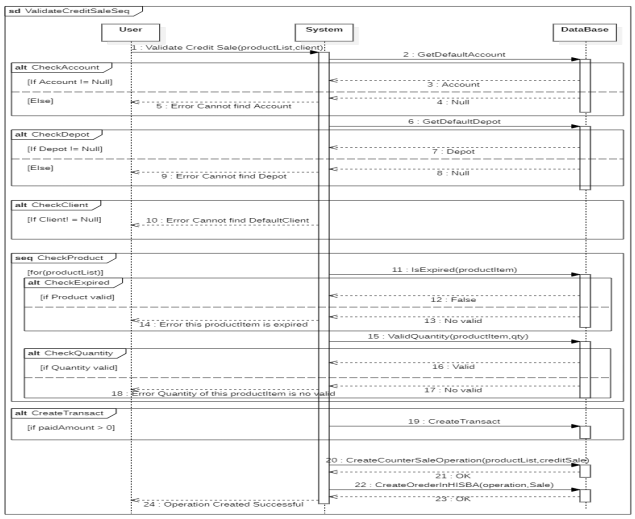

Figure 68: Credit Sale - Sequence Diagram

Title	Validate credit sale operation
Actor	User
Description	This case must be made by the user when he wants to make a credit sale, but it needs to choose the customer from the combo box containing the customer list and the paid amount must be less than net to pay amount , so the important things the user must do before validating the credit sale are: • Open the session. • Select the customer from the combo box. • There are products for sale. • the paid amount must be less than Net To Pay. After doing these important things, he fills in the discount field if he wants to, but the discount ability must be enabled in the settings, after that he has to click the validate button, after that the system create transact if the paid amount greater than 0 and create order in HISBA

Table 10: Validate credit sale

3.4.3.4 Return operations

1. Select Products in Return:

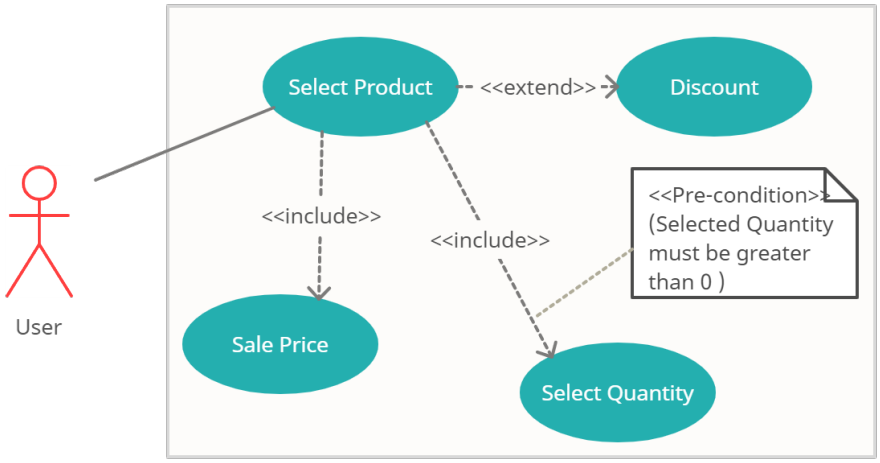

Figure 69: Select Products in Return - Use Case Diagram

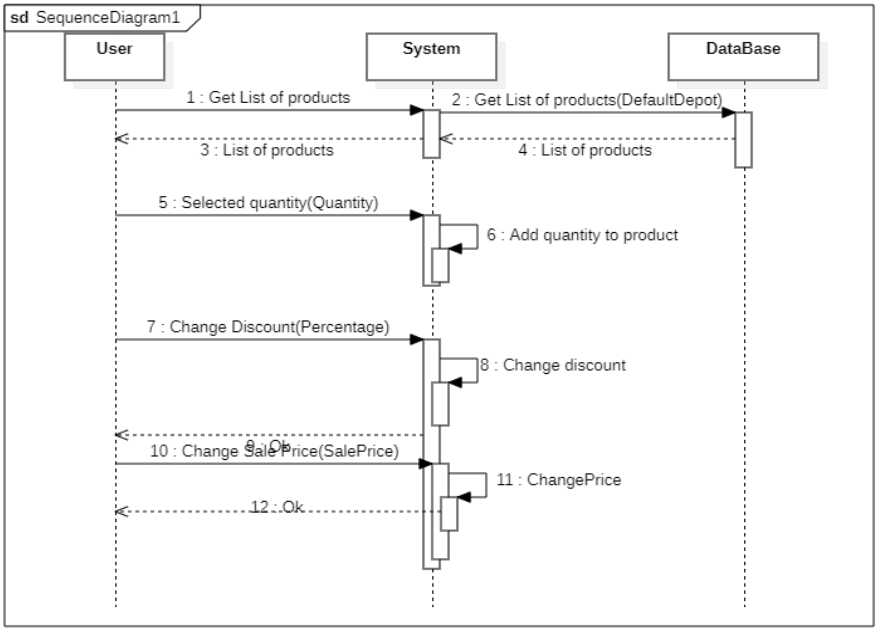

Figure 70: Select Products in Return - Sequence Diagram

Title	Select products in return
Actor	User
Description	Like we know we can not do a return of products without products so to select a product the user need to choose a product from combo box that contain a products and enter a the quantity what the client want to return of the select product. the user can define another options like add discount to the product and change the sale price, all of this options he can find it in the settings. after that he can to validate an operation.

Table 11: Select products in return

2. Validate cash return Operation (Default client):

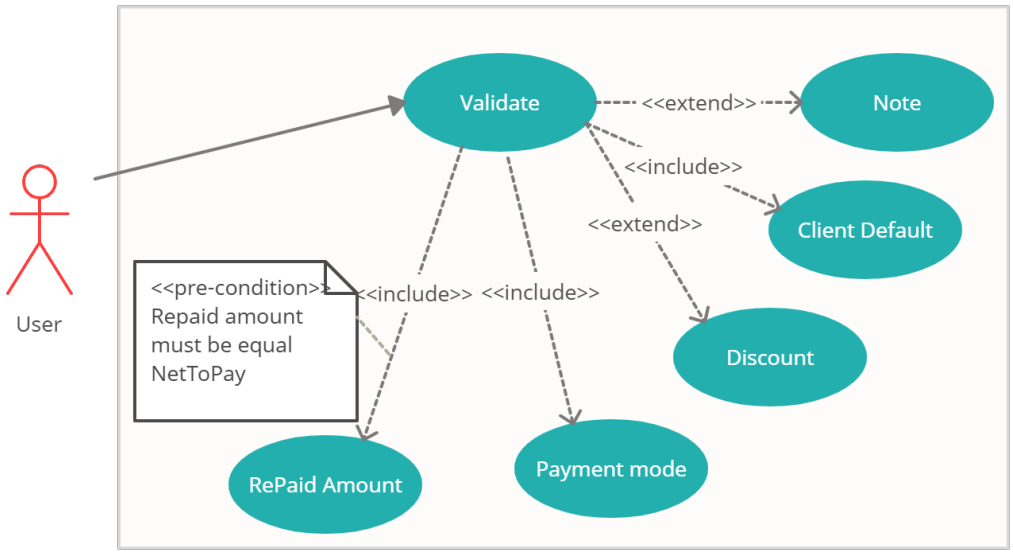

Figure 71: Cash return (Default client) - Use Case Diagram

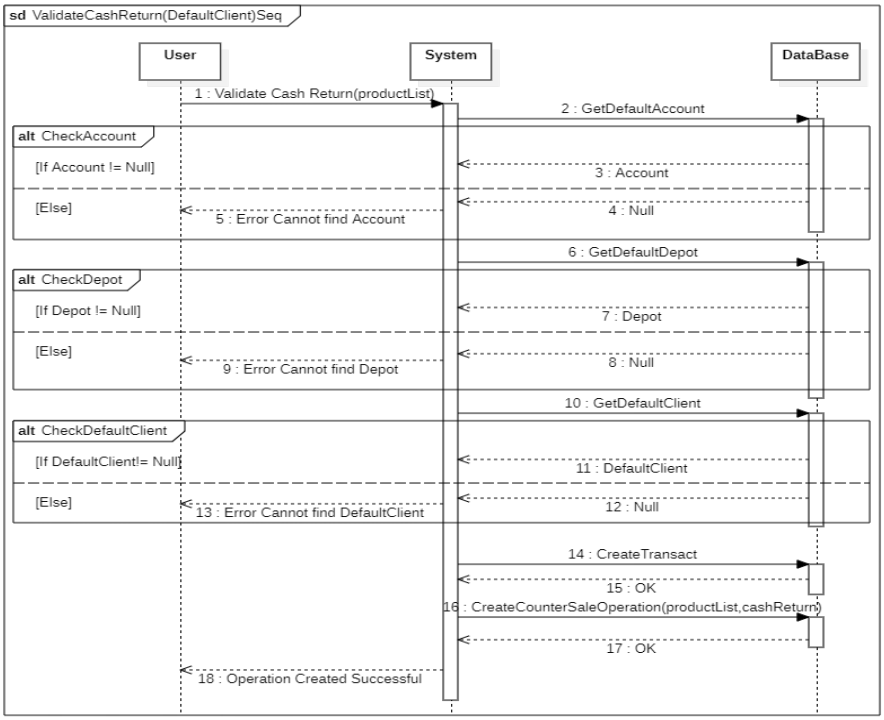

Figure 72: Cash Return (Default client) - Sequence Diagram

Title	Validate Cash return (Default client)
Actor	User
Description	This case must be made by the user when he wants to make a credit sale to an unknown customer, so he need three important things to do they before validate cash sale operation are : • Open a session if it is closed. • There are products to return. • Make sure to select the default client in the settings. After doing these three important things, he fills in the discount field if he wants to, but the discount ability must be enabled in the settings, after that he has to click the validate button. **Note:** this operation will be created under the default client.

Table 12: Validate cash return (Default client)

3. Validate cash return Operation (Client):

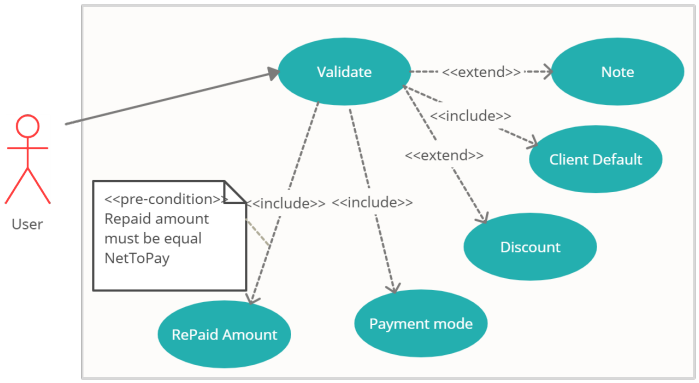

Figure 73: Cash Return (Client) - Use Case Diagram

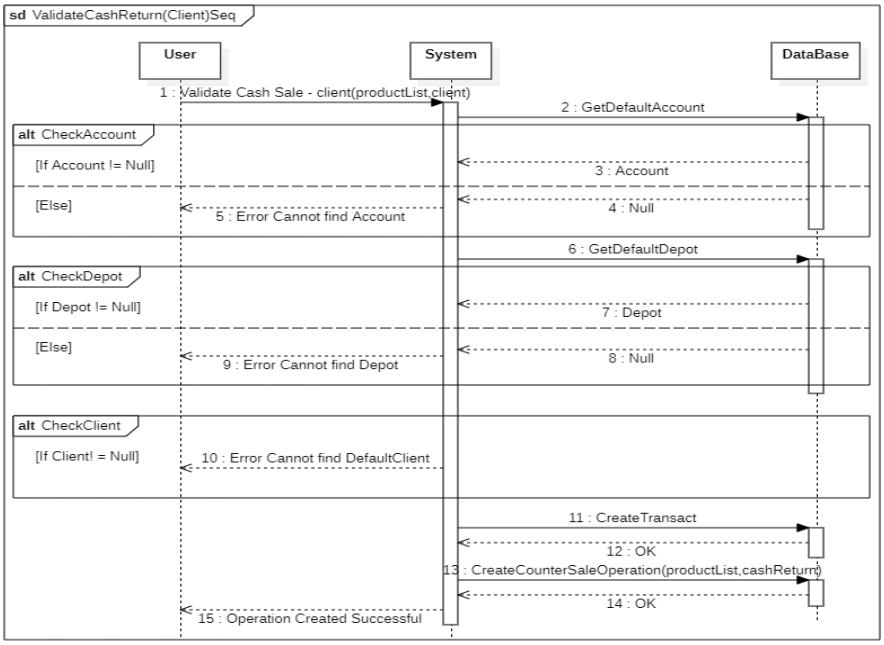

Figure 74: Cash Return (Client) - Sequence Diagram

Title	Validate Cash return (Client)
Actor	User
Description	This case must be made by the user when he wants to make a cash return to known customer, its the same with cash return operation but the two difference are the client and the repayment amount he need to enter them so there are important things he need to do before validate cash return operation are : • Open a session if it is closed. • There are products for return. • Select the customer from the Combobox that contains list of client. • Insert the repaid amount After doing these important things, he fills in the discount field if he wants to, but the discount ability must be enabled in the settings, after that he has to click the validate button, after that the system if it found the repaid amount less than net to repay it will change the type of this operation to credit return.

Table 13: Validate cash return (Client)

4. Validate credit return operation :

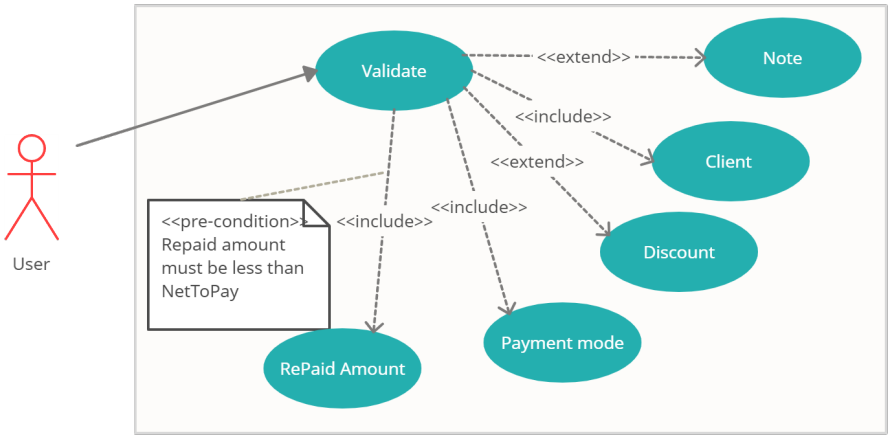

Figure 75: Credit Return - use case diagram

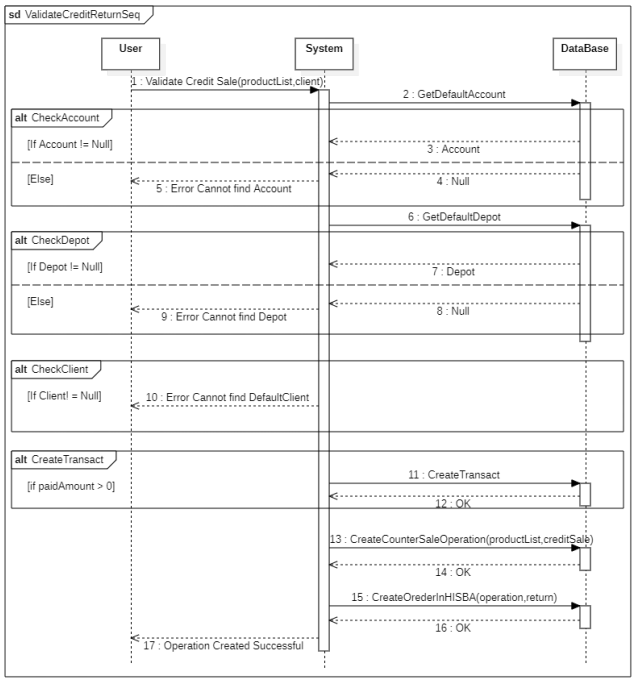

Figure 76: Credit Return - Sequence Diagram

Title	Validate credit return operation
Actor	User
Description	This case must be made by the user when he wants to make a credit return , but it needs to choose the customer from the combo box containing the customer list and the repaid amount must be less than net to repay amount , so the important things the user must do before validating the credit return are: • Open the session. • Select the customer from the combo box. • There are products for return. • the repaid amount must be less than net to repay After doing these important things, he fills in the discount field if he wants to, but the discount ability must be enabled in the settings, after that he has to click the validate button, after that the system create transact if the repaid amount greater than 0 and create order in HISBA

Table 14: Validate credit return

3.4.4 Design

3.4.4.1 Open Session

In this figure we see the window of open session, for open session the user need to choice the moneybox and fill the amount of the money that he will start with it.

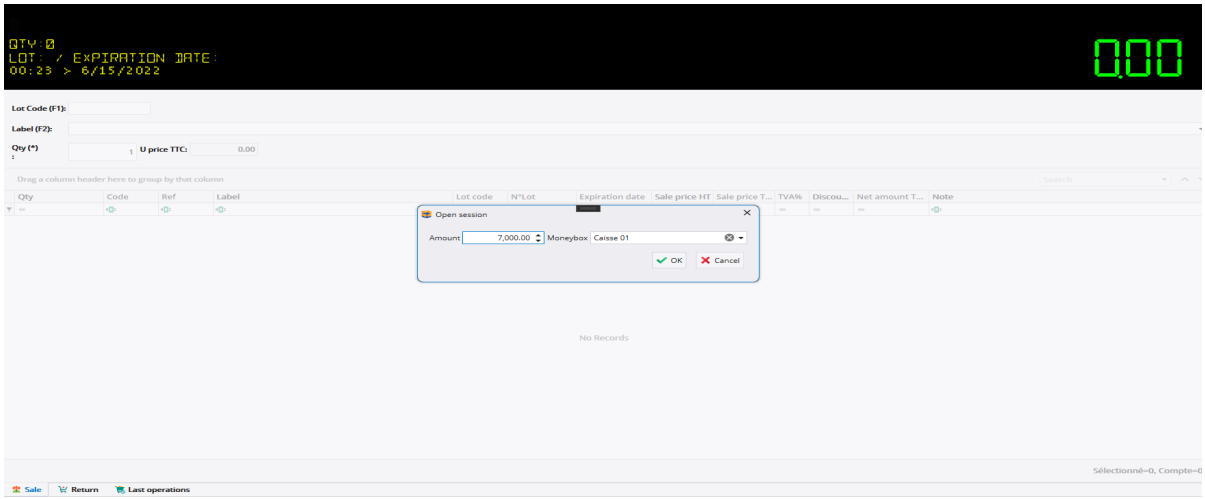

Figure 77: Open session - Window UI

3.4.4.2 Close session

In this figure we see the window of close session, for close session the user need fill the total amount of the money that he has in the moneybox when he end.

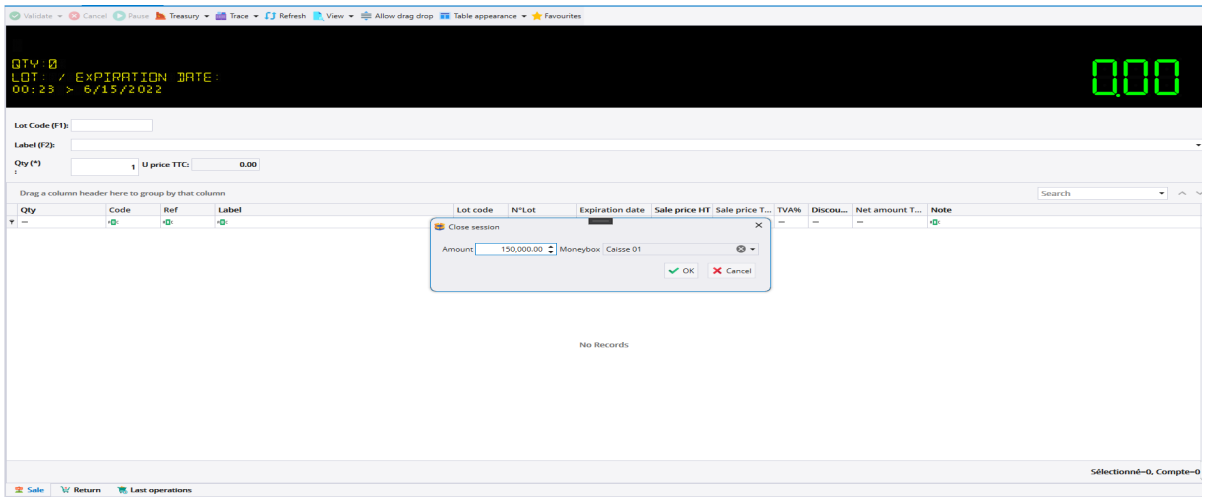

Figure 78: Close session - Window UI

3.4.4.3 Cash In

In this figure we see the window of cash in, like we see the user need fill the amount of money which he receive and select the person who received from and select the payment mode.

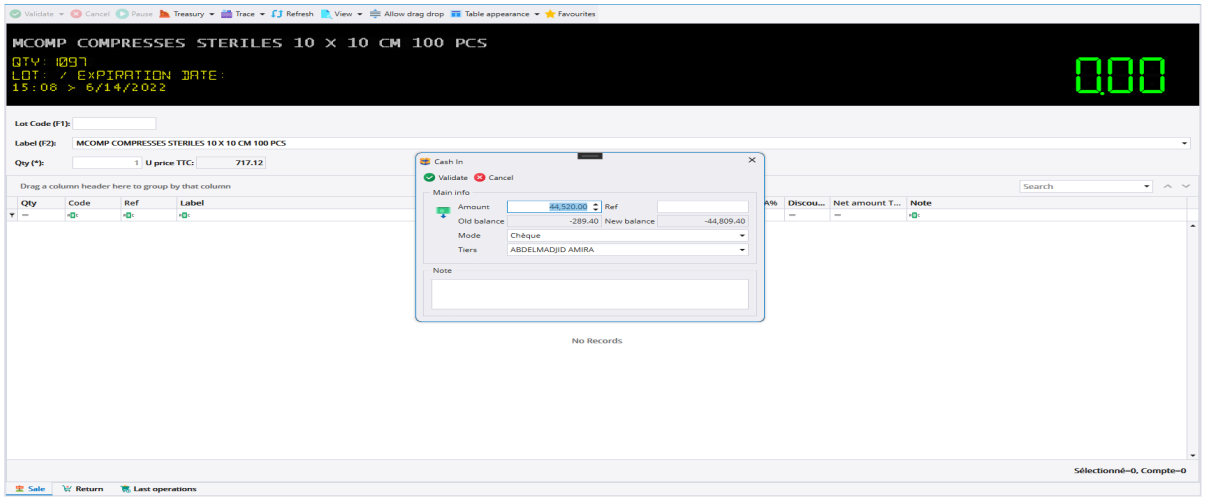

Figure 79: Cash In - Window UI

3.4.4.4 Cash Out

In this figure we see the window of cash Out, like we see the user need fill the amount of money which he give and select the person whom it is given and select the payment mode.

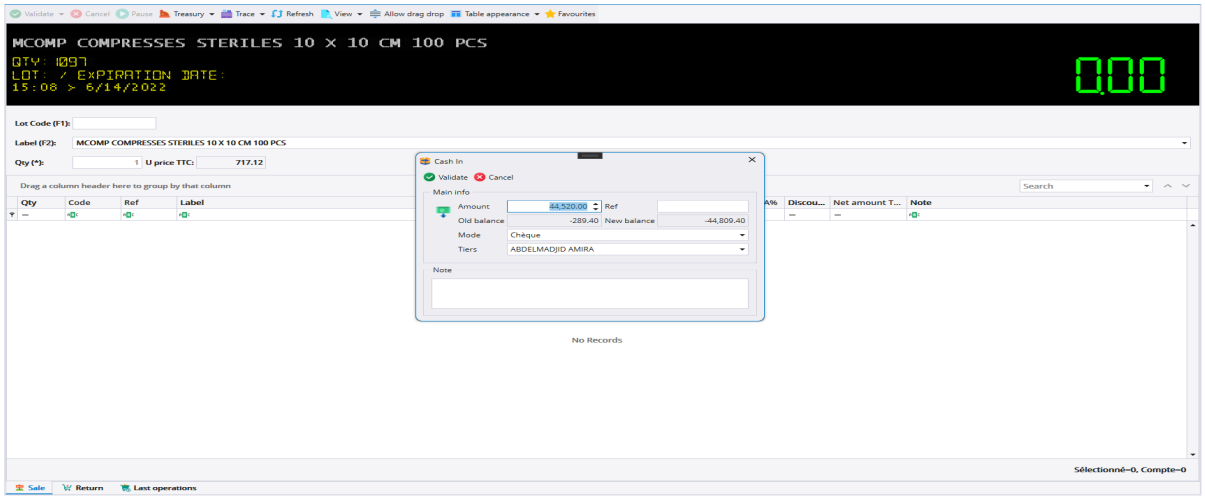

Figure 80: Cash Out - Window UI

3.4.4.5 Select Sale Products

In this figure we see the interface in which the user selects the products to sell.

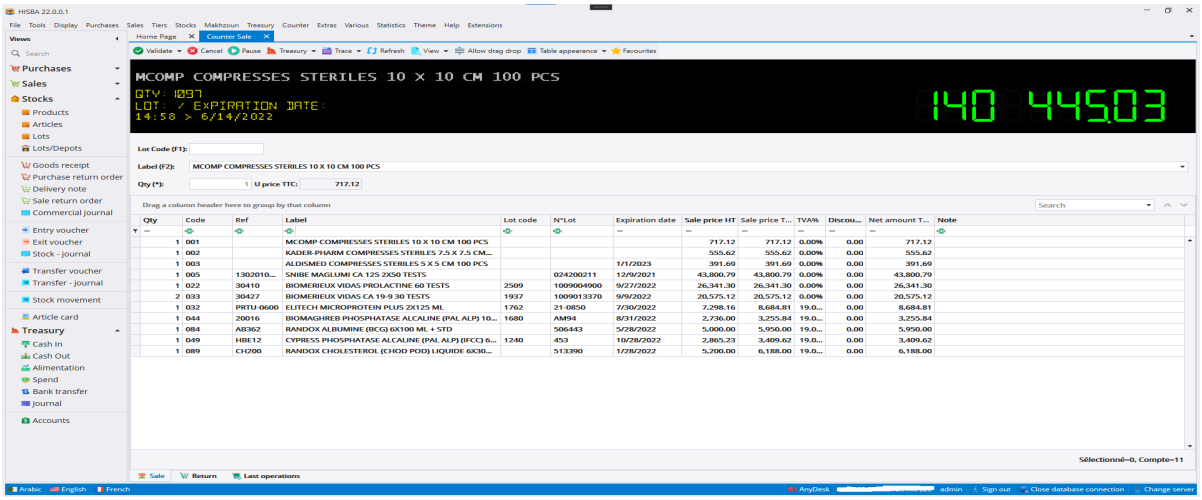

Figure 81: Select Sale Products- UI

3.4.4.6 Validate cash sale Operation (Default client)

In this figure we see the window of validate cash sale, for validate this operation the user need to fill the discount if he want and select the mode of payment, like we see he does not need to select the buyer because the buyer was already selected in setting.

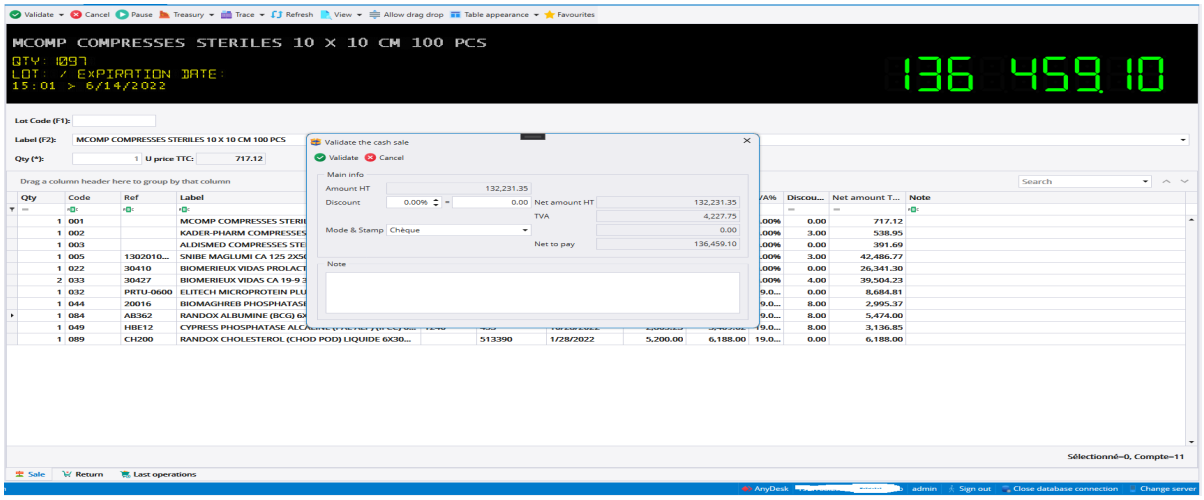

Figure 82: Validate cash sale Operation (Default client) - Window UI

3.4.4.7 Validate cash sale Operation (Client)

In this figure we see the window of validate cash sale-client, for validate this operation the user need to fill the discount if he want and select the mode of payment and fill the paid amount then select the client.
in this validation if the paid amount less than net to pay the operation will converted to credit sale.

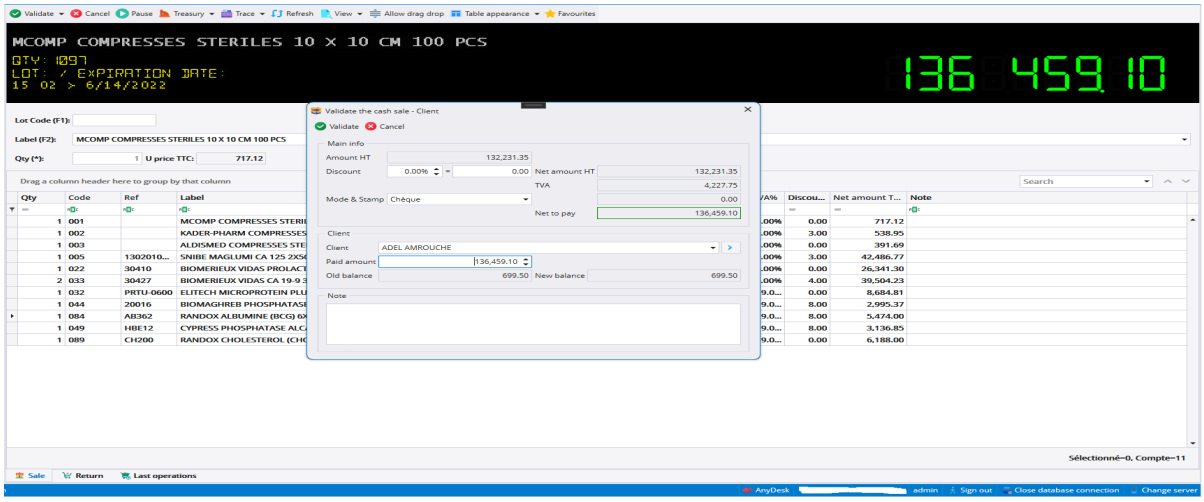

Figure 83: Validate cash sale Operation (Client) - Window UI

3.4.4.8 Validate credit sale operation

In this figure we see the window of validate credit sale, for validate this operation the user need to fill the discount if he want and select the mode of payment and fill the paid amount then select the client.
in this validation if the paid amount equal net to pay the operation will converted to cash sale.

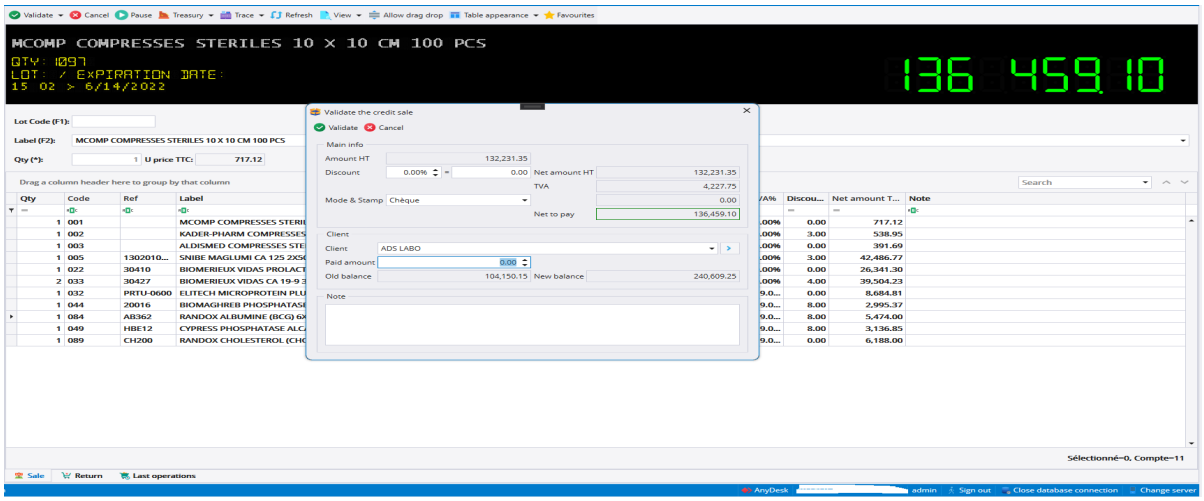

Figure 84: Validate credit sale operation - Window UI

3.4.4.9 Select Return Products

In this figure we see the interface in which the user selects the products to return.

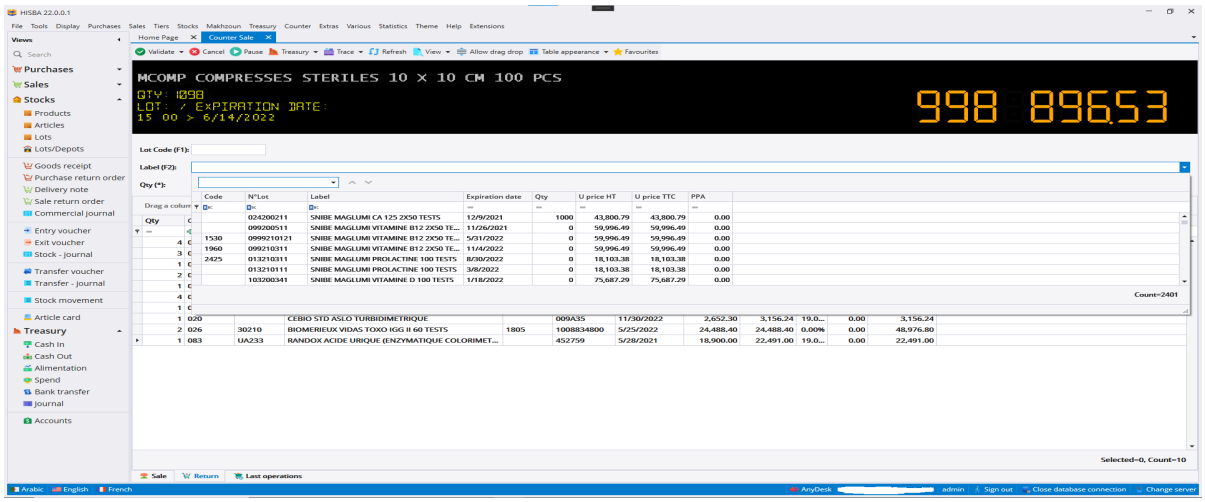

Figure 85: Select Return Products- UI

3.4.4.10 Validate cash return Operation (Default client)

In this figure we see the window of validate cash return, for validate this operation the user need to fill the discount if he want and select the mode of payment, like we see he does not need to select the buyer because the buyer was already selected in setting.

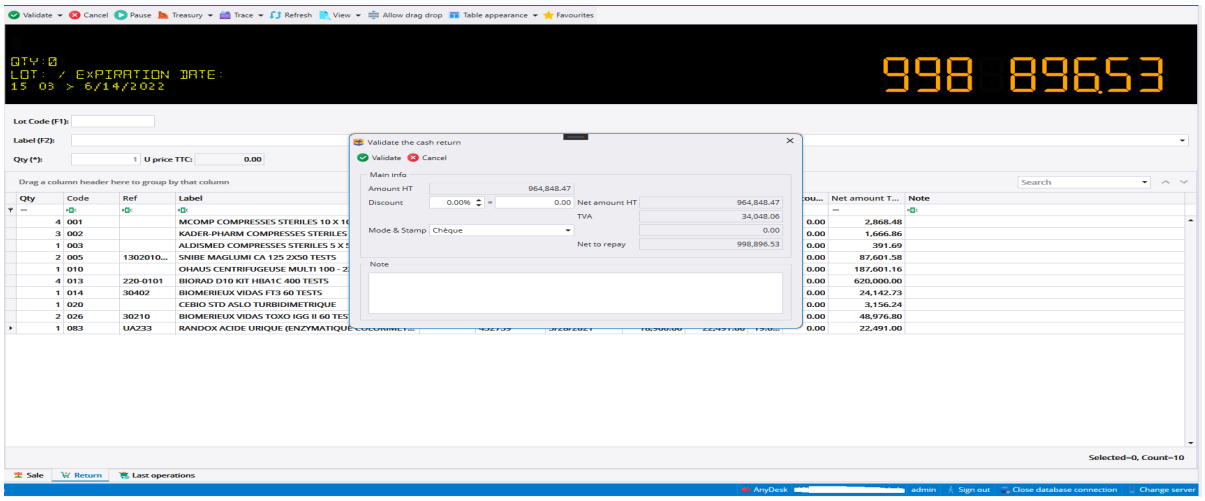

Figure 86: Validate cash return Operation (Default client) - Window UI

3.4.4.11 Validate cash return Operation (Client)

In this figure we see the window of validate cash return-client, for validate this operation the user need to fill the discount if he want and select the mode of payment and fill the repaid amount then select the client.
in this validation if the repaid amount less than net to pay the operation will converted to credit return.

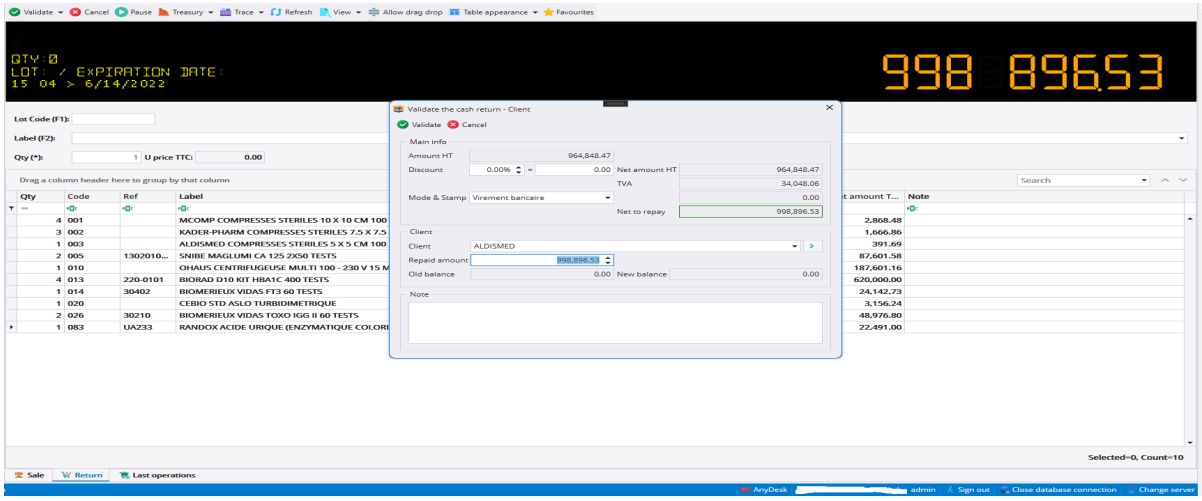

Figure 87: Validate cash return Operation (Client) - Window UI

3.4.4.12 Validate credit return operation

In this figure we see the window of validate credit return, for validate this operation the user need to fill the discount if he want and select the mode of payment and fill the repaid amount then select the client.
in this validation if the repaid amount equal net to pay the operation will converted to cash return.

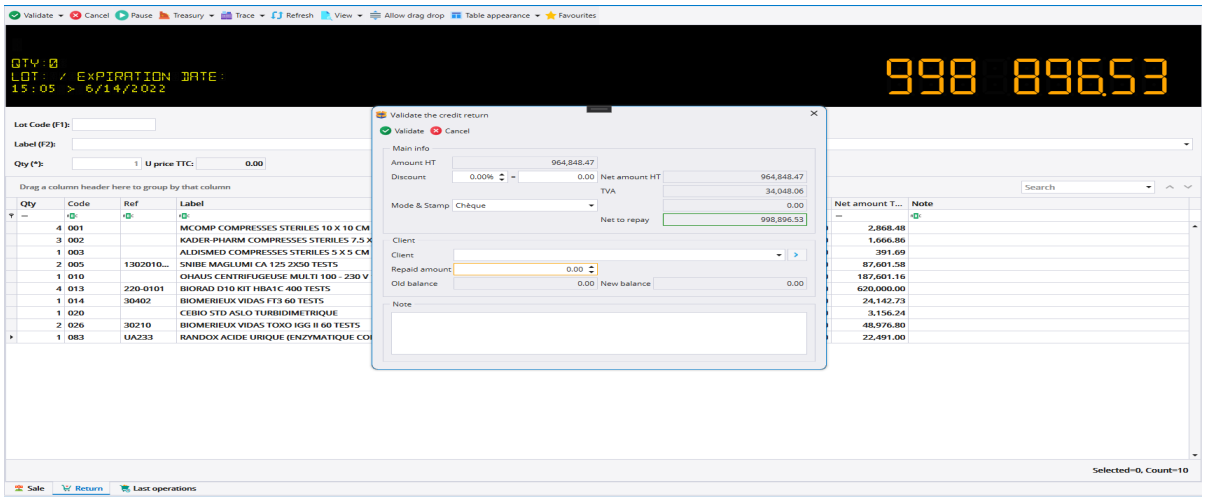

Figure 88: Validate credit return operation - Window UI

3.4.4.13 Pause Operations

In this figure, we see the paused operations window whose goal is to facilitate and provide flexibility during sales? for example the user already fill the products of the first buyer and its wil taken a lot of time on during that another buyer come but he has only one product so to let him go first the user pause the current sale and selling the second buyer after that return to the paused operation and continue the sale.

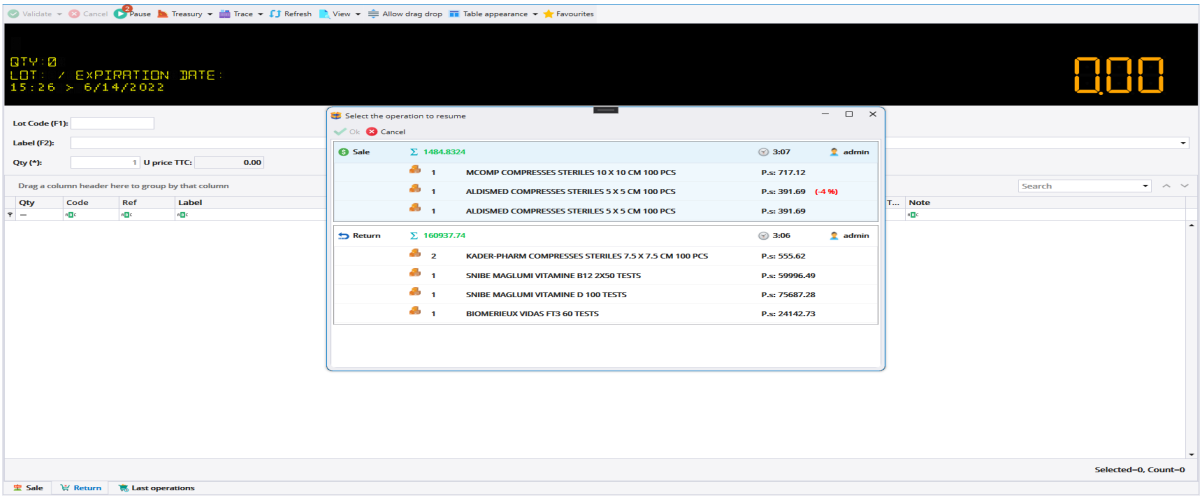

Figure 89: Pause Operations - Window UI

3.4.4.14 Counter sale last operation

In this figure, we see the last operations interface which has the last operation which the user do it, the tail of the showing he can control it from the settings.

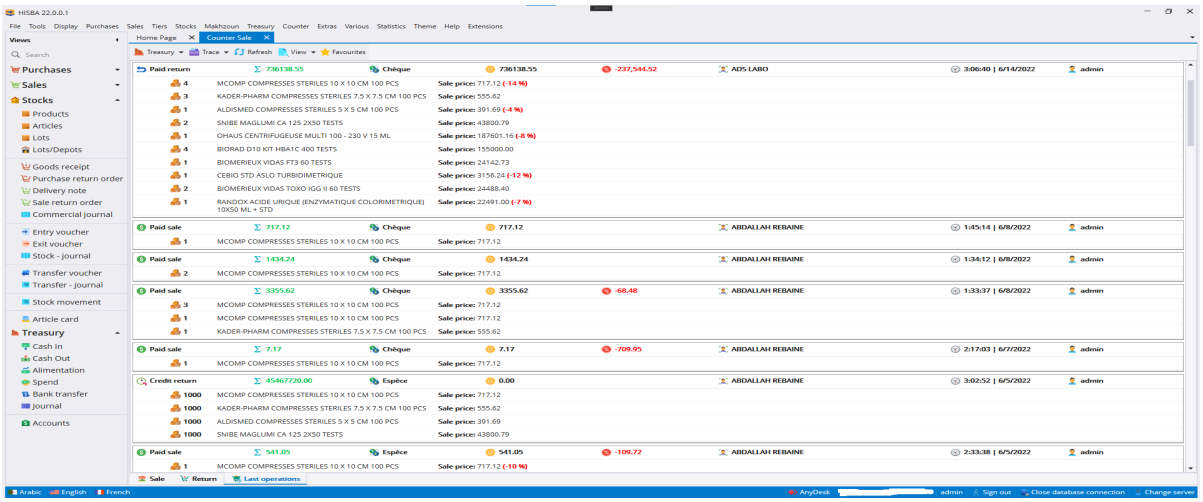

Figure 90: Counter sale last operation - UI

3.4.4.15 Counter Sale Settings

In this figure, we see the paused operations window that enables the user to configure the appearance or actions in an application, operating system or the hardware. Also called "preferences," "tools" and "options." like allow the discount and choose the default printers etc.

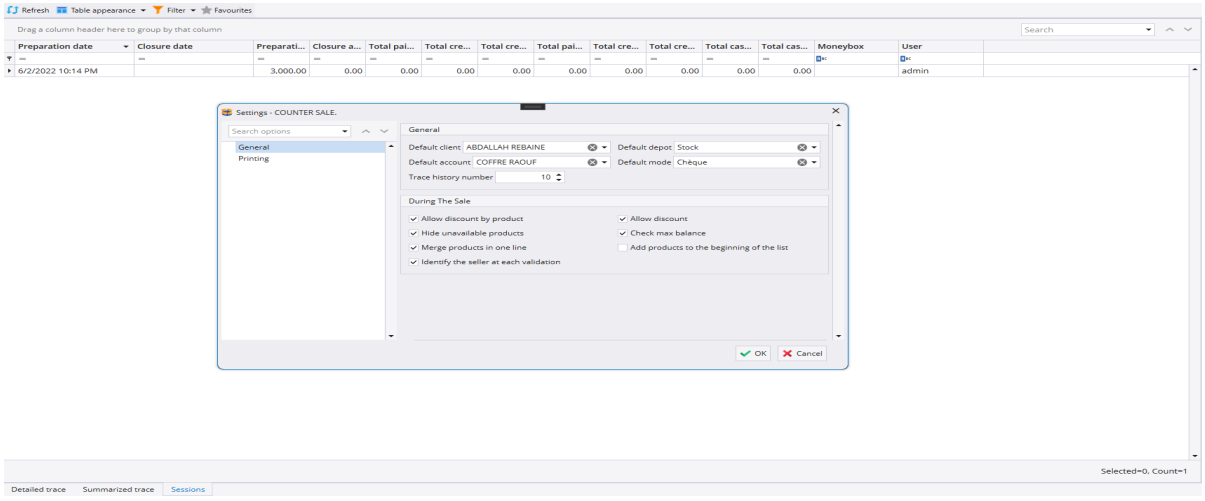

Figure 91: Counter Sale Settings - Window UI

3.4.4.16 Trace Journal

In this figure, we see the Trace Journal table which has all the operation which the user do it in the trace.

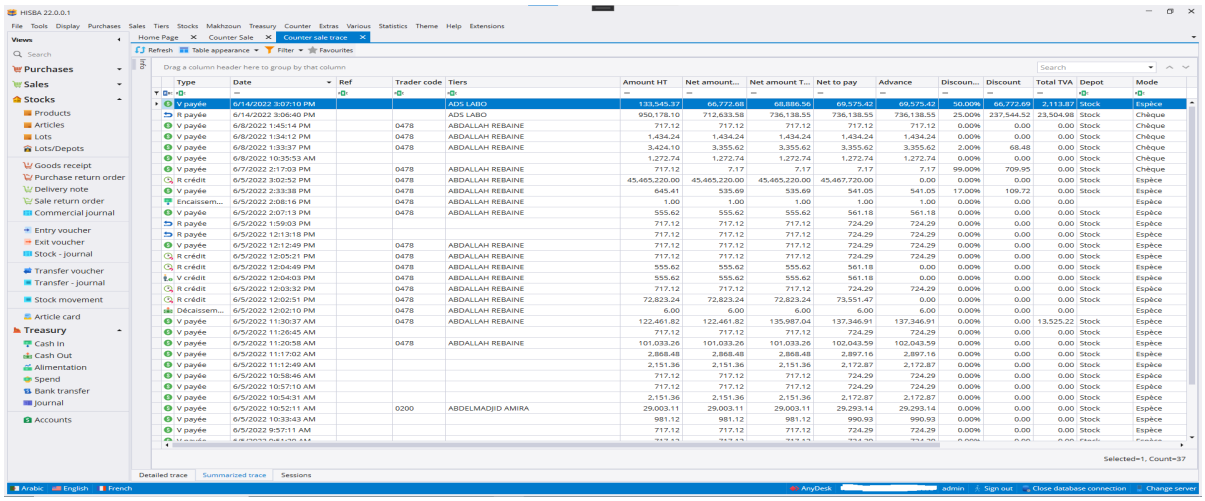

Figure 92: Trace Journal - UI

3.5 Conclusion

MELOUKI GROUP has hired programmers and developers to develop HISBA ERP software for the company, which is a good step for self-sufficiency. In this chapter, we dealt with the design and modeling of HISBA Point Of Sale (P.O.S) mechanisms Our system is by UML. It will make it possible to organize and facilitate the facilitation of sales and trade in general, all that a seller needs. In order to achieve this goal, We started with the latest logarithms in the basic concepts of our work, We can say that we have achieved the goals set at the beginning of our dissertation with a P.O.S system that is salable and start-up for multiple stores. In the end, this project was a good experience that allowed us to cross the professional world.

Chapter Four

In this Chapter we will talk about System Realizations which we used them in this work like languages, frameworks and tools

4 Chapter Four : System Realization

4.1 Languages

1. **C-Sharp**:
   C-Sharp is an object-oriented programming language with strong typing that allows the development of web, heavy client and API applications. It is mainly used with the .NET framework.[3].

Figure 93: Logo CSharp

2. **SQL**
   SQL (Structured Query Language) is a computer language used to operate databases. It generally allows the definition, manipulation and security control of data.

   In practice, the SQL language is used to create tables, add records in the form of rows, query a database, update it, or even manage the rights of users of this database. It is well supported by the vast majority of database management systems (DBMS). Created in the early 1970s by Donald D. Chamberlin and Raymond F. Boyce, both at IBM, the SQL language is now recognized as an international standard.

   Many databases are based on the SQL language. This is the case of MySQL, which is part of the LAMP free software suite, but also of Oracle database servers, D2B, Microsoft SQL Server, etc.[7]

Figure 94: SQL

3. **UML**
   UML, short for Unified Modeling Language, is a standardized modeling language consisting of an integrated set of diagrams, developed to help system and software developers for specifying, visualizing, constructing, and documenting the artifacts of software systems, as well as for business modeling and other non-software systems. The UML represents a collection of best engineering practices that have proven successful in the modeling of large and complex systems. The UML is a very important part of developing object oriented software and the software development process. The UML uses mostly graphical notations to express the design of software projects. Using the UML helps project teams communicate, explore potential designs, and validate the architectural design of the software. In this article, we will give you detailed ideas about what is UML, the history of UML and a description of each UML diagram type, along with UML examples. [40]

Figure 95: UML

4.2 Development environments

1. **SQL Server**;
   Microsoft SQL Server, also called "SQL Server" or sometimes more simply "MSSQL", is a relational database management system developed by Microsoft. This system is exclusively available on the Windows environmentThe first versions of SQL Server, up to version 6.0, were developed by Microsoft in partnership with Sybase and even with the Ashton-Tate company. The partnership between the companies was broken in 1994[7].

Figure 96: Sql-Server

2. **Visual Studio**
   Visual Studio, also known as Microsoft Visual Studio and VS, is an integrated development environment for Microsoft Windows. It is a tool for writing computer programs, websites, web apps, and web services. It includes a code editor, debugger, GUI design tool, and database schema designer, and supports most major revision control systems. It is available in both a free "Community" edition and a paid commercial version [14].

   Programming languages supported by Visual Studio

   - C
   - C++
   - C
   - Visual Basic .NET
   - F
   - Python
   - JavaScript

Figure 97: VS

3. **devexpress**:
   DevExpress (Developer Express) is a software development company based in the United States. It produces coding assistance tools and components for Delphi, C++ Builder and Microsoft Visual Studio developers. The major part of its product line is VCL, .NET WinForms and ASP.NET components that replicate the UI of Microsoft Windows and Microsoft Office applications. DevExpress has won many industry awards for its products [6].

Figure 98: Devexpress

4.3 Framework

1. **.NET WPF**
   Windows Presentation Foundation is a UI framework that creates desktop client applications. The WPF development platform supports a broad set of application development features, including an application model, resources, controls, graphics, layout, data binding, documents, and security.

   WPF is part of .NET, so if you have previously built applications with .NET using ASP.NET or Windows Forms, the programming experience should be familiar. WPF uses the Extensible Application Markup Language (XAML) to provide a declarative model for application programming. [20]

Figure 99: .Net WPF

4.4 Tools

1. **GitHub**
   GitHub, Inc. is a provider of Internet hosting for software development and version control using Git. It offers the distributed version control and source code management (SCM) functionality of Git, plus its own features. It provides access control and several collaboration features such as bug tracking, feature requests, task management, continuous integration, and wikis for every project. Headquartered in California, it has been a subsidiary of Microsoft since 2018.

   It is commonly used to host open-source projects. As of November 2021, GitHub reports having over 73 million developers and more than 200 million repositories (including at least 28 million public repositories).It is the largest source code host as of November 2021.[28]

Figure 100: GitHub

2. **StarUML**
   StarUML is an open source Unified Modeling Language (UML) modeling software which can replace in many situations commercial and expensive software like Rational Rose1 or Together2 . Being easy to use, requiring little system resources, supporting UML 2, this software is a great option for familiarization with modeling. However, only a Windows version is available. Software website: http://staruml.sourceforge.net/en/ .[15]

Figure 101: staruml

3. **Latex**
   is a software system for document preparation. When writing, the writer uses plain text as opposed to the formatted text found in "What You See Is What You Get" word processors like Microsoft Word, LibreOffice Writer and Apple Pages. The writer uses markup tagging conventions to define the general structure of a document to stylise text throughout a document (such as bold and italics), and to add citations and cross-references. A TeX distribution such as TeX Live or MiKTeX is used to produce an output file (such as PDF or DVI) suitable for printing or digital distribution.

   LaTeX is widely used in academia for the communication and publication of scientific documents in many fields, including mathematics, computer science, engineering, physics, chemistry, economics, linguistics, quantitative psychology, philosophy, and political science. It also has a prominent role in the preparation and publication of books and articles that contain complex multilingual materials, such as Sanskrit and Greek. LaTeX uses the TeX typesetting program for formatting its output, and is itself written in the TeX macro language. [18]

Figure 102: Latex

4. **Beamer**
   Beamer is a powerful and flexible LaTeX class to create great looking presentations. This article outlines the basis steps to making a Beamer slideshow: creating the title page, adding a logo, highlighting important points, making a table of contents and adding effects to the slideshow.[26]

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ملخص

يعد برنامج تخطيط موارد المؤسسات بمثابة نظام معلومات يجعل من الممكن إدارة ومراقبة كل المعلومات والخدمات التشغيلية للشركة يوميًا

الموضوع المقدم هو تطبيق برنامج تخطيط موارد المؤسسات لشركة ملوكي .

دراسة الحالة تهدف إلى تلبية احتياجات الشركة ذات النشاط الوطني والدولي.

مهمتنا هي تطوير حل)برنامج تخطيط موارد المؤسسات(في شركة ملوكي ، وتريد هذه الشركة القيام بذلك لحل مشكلة تزايد تكاليف الإدارة ، والأكثر أهمية هو متابعتها. خطوط و وحدات الإنتاج و تتبعها .

كلمات مفتاحية : برنامج تخطيط موارد المؤسسات ، حسبا اورب

Abstract

ERP is an information system that makes it possible to manage and monitor on a daily basis all the information and operational services of a company.

The subject presented is the Implementation of an ERP Solution, MELOUKI (MELOUKI Enterprise Resource Planning) The case study is to meet the need of a company with a national and also international activity.

Our job is the development of an ERP solution at the company MELOUKI. This company wants to have an ERP solution to increase its efficiency to reduce its management costs, and the most essential is to follow Production line to keep traceability.

Key Word: Enterprise Resource Planning , Hisba-ERP

Résume

L’ERP est un système d'information qui permet de gérer et suivre au quotidien, l'ensemble des informations et des services opérationnels d'une entreprise.

Le sujet présenté consiste à l’Implémentation d’une Solution ERP, MELOUKI (MELOUKI Enterprise Resource Planning) L’étude de cas consiste à répondre au besoin d’une société ayant une activité nationale et aussi internationale.

Notre travail consiste a le développement d'une solution ERP a l'entreprise MELOUKI.Cette société désire se doter d’une solution ERP afin d’augmenter son efficacité de réduire ainsi ses frais de gestion, et la plus essentielle est le suivre la ligne de production pour garder la traçabilité.

Mots Clés: Enterprise Resource Planning, Hisba-ERP