INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH AND INNOVATIVE STUDIES
IJSRIS journal
ISSN: 2820-7157
Advancing Knowledge, Inspiring Innovation
www.ijsrisjournal.com
INDEXED JOURNAL
PEER REVIEWED Rigorous & Transparent
DOI: CROSSREF Member
OPEN ACCESS For Global Visibility
BI-MONTHLY Timely Publication
WIDE READERSHIP High Impact & Visibility
AUTHOR FRIENDLY Fast | Supportive | Reliable

RECEIVED 19 June 2026
ACCEPTED 10 July 2026
PUBLISHED 1 August 2026
Pages from: 465 to 474
August 2026 | Volume 5 | Number 4

Design of an automated information system for commercial management in a multi-branch organisation

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ABSTRACT

The reliability and sharing of information amongst operations managers within a multi-branch commercial enterprise is of great importance. A number of challenges to ensuring this sharing include: the availability of information at head office, the analysis and consolidation of data, information security, …

In this article, we propose to identify potential solutions that can help the company overcome these challenges. To resolve this issue, we have designed an IT model tailored to multi-branch retail businesses, comprising algorithms and UML diagrams (use-case diagrams and class diagrams). This has resulted in effective control, ease of data consolidation and improved, timely decision-making.

Keywords: Branch, Retail Business, Information System.

I. Introduction

Across the world, businesses are investing huge sums in information technology (R. SUSANNE et al., 2000) . Developments in this field have acted as both a support and a catalyst in increasing the importance of information. Furthermore, in Western societies, many people are involved in collecting, processing and distributing information as part of their daily work. As a result, there are many computers installed around the world. Businesses are connected via numerous fibre-optic cables, wires and radio waves to enable services to operate. Nevertheless, specialised software programmes constitute another means of processing information (R. O. Masson, 2008) .

Commercial enterprises represent a vast field of application for information technology; some companies use information systems that do not truly meet their needs, leading to errors in their information processing. Yet these kinds of errors have a direct impact on the company's turnover (R. SUZANNE, 2002.) . However, some companies have recognised the benefits of new technology and are seeking reliable ways to adapt their information systems effectively.

Nowadays, there are companies whose business activities are spread geographically across several sites. Their aim is to 'maximise profits'. Thanks to their capacity to 'innovate' and their networks, they are winning over customers in significant markets. As a result, they face difficulties in their day-to-day exchange of information (R. SANDRETTO, 2005.) However, to ensure a company's survival, collaboration is required between the three levels of management, and transparency must be demonstrated in the operations carried out within the company. This lack of collaboration can lead to actors in the micro-environment – such as traders, salespeople, brokers and others involved in commercial management – misusing the company's resources to line their own pockets.

Consequently, we asked ourselves the following question: **Which IT model would be best suited to commercial management in a multi-branch company?**

The design and implementation of an automated information system for commercial management in a multi-branch company, with a view to improving the information system and ensuring the sharing of information amongst managers.

In practical terms, this automated information system will need to record stock movements into and out of the central warehouse and branches, display a consolidated sales report, and analyse product sales by branch.

II. Literature Review

In this section, we present certain theories relevant to our topic with the aim of contextualising our research in order to establish a clear framework. In companies that have adopted such systems, branches bring not only their strengths but also their challenges.

According to CSMART ERP (2025), the centralisation of information flows, stock management across different entities, accounting, etc., within a multi-branch organisation presents a real challenge for large organisations. However, with good organisation and best practices, this becomes simpler. Furthermore, the use of suitable tools facilitates management, particularly new technologies. (CSMART ERP, 2025)

My Komela, 2026, highlights the importance of effective stock management in a multi-branch business – which it refers to as 'multi-store' – noting that 43 per cent of managers in multi-branch retail businesses are unaware of the exact value of their stock due to a lack of suitable tools. However, dedicated software ensures the reliability of figures at all times. (My KOMELA, 2026)

For Gilbert MATONGO, a sales management application is essential within a multi-branch business given the challenges such organisations face: problems with the communication of information between branches. To address these issues, the author proposed the creation of a new management system using Access-VBA programming over a network. This enables the existing system to be updated, whilst also providing a LAN and WAN network to optimise the time taken and ease of generating sales reports from other branches. (Gilbert MATONGO, 2009)

According to Bishop MUHINDO KAHAMBA6, companies with multiple branches face a problem with site interconnectivity. That is to say, there is a lack of an internal communication system that would enable the company to monitor its branches. To resolve this problem, he developed a solution enabling the organisation to monitor the overall, day-to-day status of customer management across its various branches. This led to the development of a WAN network with simulation capabilities. (Bishop MUHINDO KAHAMBA, 2016)

Nevertheless, given the results obtained, we find these systems insufficient for resolving the problems faced by multi-branch enterprises. We focus on the problem of data consolidation. The company needs to know the total turnover generated across all its branches. A decentralised database will not be able to consolidate all the data provided by the

branches in a timely manner. Suppose a company has a large number of branches; whilst the company will be able to access the sales figures from its branches, centralising this data will present a further challenge for the organisation.

However, this system could be an asset to businesses when it comes to communicating information and compiling results for companies with a minimum number of branches. The aim of commercial enterprises is to maximise profit and attract customers worldwide, which leads to the establishment of multiple branches.

To develop a solution to this problem, we believe it would be useful to have a system capable of compiling the company's information, with the aim of establishing a single data repository shared by all the company's units. Hence our objective of producing a consolidated sales report.

As regards management, we do not consider sales management alone to be sufficient for a company with multiple branches. Most companies with multiple branches source products and distribute sufficient quantities to their branches for resale. Head office needs to find a tool that will enable it to effectively monitor the flow of these products. A sales management system can help the organisation track how much each branch has sold, but determining each branch's share of profit within the organisation's turnover may prove problematic.

However, resolving this issue requires a business management system that includes modules for, amongst other things, distribution, procurement and stock management.

Stock refers to products held in warehouses or shops awaiting future use (J.WILLIAM, 2002) . Stock in a commercial enterprise must be carefully managed, as inadequate stock control can lead to a surplus or a shortage of items. The function of stock control is to indicate the status of stock at a given point in time and to provide information regarding product identification at all times. It also provides details of the product group, its specifications, the quantity in stock, the date of receipt and the date of issue. (J.WILLIAM and P., 2001)

The overall objective of stock management is to achieve satisfactory levels of customer service whilst keeping total costs within reasonable limits. To achieve this objective, one must determine the quantity to order and when to order in order to minimise the total cost of stock management. It should be noted that there are several methods of stock valuation, including the weighted average cost of incoming stock method and the weighted average cost of incoming stock and opening stock method, (Robert W. Maffat, 2025) ….

Procurement involves sourcing products from suppliers with a view to providing the customer with the right product, at the right time and in the right place. This provides a huge competitive advantage.

Indeed, **Compaq Computer**, one of the world's leading computer manufacturers, estimates that it lost nearly a billion dollars in sales because its products were not available for sale in the right place at the right time (J. WILLIAM and P, 2001) .

Effective supply chain management has several objectives: 'cost reduction, improving product availability at the right time for market launch, and enhancing flexibility'.

According to a study by **'Robert W. Moffat,** Senior Vice-President and Executive Director of the Systems and Technology Group at IBM10', in his article on a global survey of procurement managers, the strategic objectives of a procurement department are to:

- Contribute to improving financial results,
- Drive continuous improvement through supplier relationships,
- Protect the business (supply disruption management).

The core of the role consists primarily of meeting the needs of branches or customers by securing the best performance from suppliers and optimising total costs. Nevertheless, the procurement of goods is carried out with a view to ensuring that products intended for distribution are available at the right time.

In companies with multiple branches, distribution takes place at two levels: to branches and to customers.

However, there is business management software available that enables operations such as procurement, stock management and distribution to be carried out…

III. Methods

This section examines the methodology that enabled us to achieve our objectives.

Given that an Information System (referred to as IS) represents the set of elements involved in the management,

processing, transmission and dissemination of information within the organisation, designing such a system is not straightforward, as it requires careful consideration of the entire organisational structure to be put in place. The analysis and design phase requires methods that enable the creation of a model on which to base our work .

To carry out our analysis effectively, and to design and implement an information system suited to a commercial enterprise with multiple branches, we used one of the agile methods: the Unified Process, combined with the UML modelling language, which enables the design of an information system in a standardised and methodical manner. (Véronique Messager Roba, 2008)

This methodology is applied by identifying the tasks to be carried out, that is to say, the various activities. It is essential to follow a process in order to achieve the objectives. As mentioned earlier; to successfully carry out our analysis, design and implementation the Unified Process has a life cycle comprising four stages, which are:

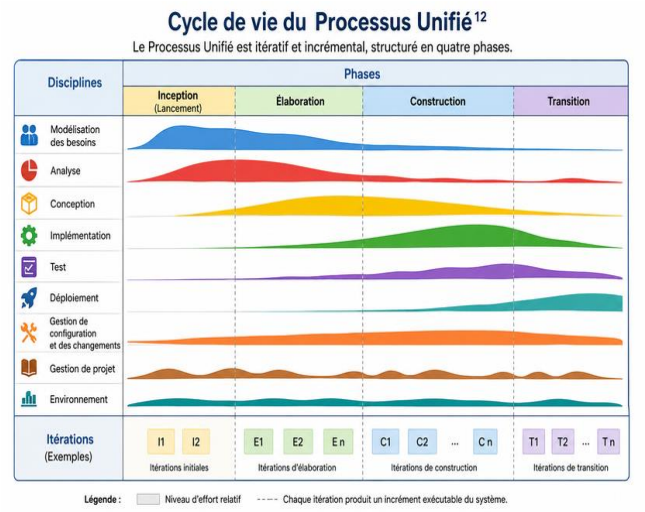

Figure 1 : Unified Process Life Cycle12

- **Inception or Preliminary Study**: the aim of the Inception phase is to reach a consensus amongst all stakeholders on the project's vision or scope, the project boundaries and the overall estimate. This involves presenting user requirements, defining the project scope, drawing up specifications, identifying the stakeholders, and outlining the various functionalities of our system. This constitutes the requirements analysis.

- **Development**: the development phase aims to establish and validate the reference architecture, mitigate the main risks and specify the requirements in detail; in this section, our work will present the analysis and design of the system.

- **Construction**: the aim of the construction phase is to deliver an initial operational version of the system, accompanied by its documentation. This is the implementation or roll-out of the system.

- **Transition**: the aim of the transition phase is to deploy the final version of the application, which has been tested by users, and put it into production. In this section, we will test our system, taking users' needs into account, in order to identify any flaws and correct them (Nicolas Payette, 2024) .

The use of modelling has long been an essential practice in software development, as a model is designed to help anticipate the results of coding. However, the Unified Modelling Language will enable us to build several models of our system: some show the system from the users' perspective, others show its internal structure, whilst others provide a global or detailed view. The models complement one another and can be combined; they are developed throughout the system development lifecycle (Charroux B., Osmani A. & Thierry-Mieg, 2009) .

We will therefore highlight, for each model, the key UML diagram(s) it contains, which enable it to focus on a particular aspect of development.

a. From a functional perspective

This perspective will enable us to represent the system's activities, that is to say, what happens within the system. In short, the representation of the functions performed by the system.

With this in mind, we will present the use case diagram and the static context diagram to show the system's boundaries.

b. From a static perspective

This perspective will enable us to provide a static representation of the system to be developed. In other words, we will need to represent what is contained within the system. With this in mind, we will need to construct the class diagram.

c. From a dynamic perspective

This perspective will enable us to illustrate the dynamic view step by step using the UML diagrams associated with this perspective. It shows the various changes within the system. We have used the state transition diagram and the activity diagram.

IV. The UML procedure

IV.1. From a functional perspective

In this section, we represent the roles played by entities that interact with the system, as well as the functions or sequences of actions performed by the system as observed by the actors, which leads us to the production of the use case diagram.

IV.1.1. The actors in our system and their tasks

An actor represents a role played by an external entity (human user, hardware device or another system) that interacts directly with the system under study. An actor can directly view and/or modify the system's state by sending and/or receiving messages that may carry data (Roques P., 2007) . With regard to our multi-branch sales management system, there are seven (7) actors: the administrator, the central manager, the branch manager, the logistics manager, the sales manager, customers and suppliers.

The central manager (CM), who is also the Administrator, is responsible for monitoring changes in central stock levels. Furthermore, they are responsible for reviewing the breakdown of sales by branch and by product over a given period. At the end of each period, they must consolidate the sales figures from all branches. Branch managers (BM) are responsible for monitoring stock levels within the branches based on recorded sales; the logistics manager (LOG) is responsible for managing orders. This order management is carried out based on the requirements arising from the central stock. Sales managers are responsible for processing information relating to customer orders and the delivery of goods. The customer is a secondary stakeholder who places orders, which are then processed by the sales managers. The supplier's role is to deliver the required items to the company.

IV.1.2. Use Cases

A *use case* represents a set of sequences of actions carried out by the system that produce an observable result of interest to a particular actor. A use case models a service provided by the system. It expresses actor/system interactions and provides 'significant' added value to the actor concerned (Roques, 2007) Here are the features of our system: **Manage branches –** this feature allows you to create new branches and assign them to a company. It also allows you to add users for that company. **Manage sales –** this feature allows you to record all sales made within the branches. **Analysing and consolidating sales**: This feature enables you to view sales reports for a given period across all branches, by branch and by product. **Monitoring branch stock levels**: This feature enables you to process all stock movements at branches (stock receipts and issues). It creates branch stock receipt and issue notes. **Monitoring central stock levels:** this feature enables you to process all movements in central stock (incoming and outgoing stock). It creates central stock receipt and issue notes. **Managing Supplier Orders**: this feature enables you to create a supplier order, view supplier orders and view a purchase order.

IV.1.3. The use case diagram

This diagram illustrates the use cases (functions) and the actors who benefit from these functions. The use case diagram is a behavioural diagram in the Unified Modelling Language (UML) that represents the main functionalities of a system from the users' perspective. It highlights the interactions between external actors and the system, specifying the services or functionalities to which each actor has access. It is therefore an important tool in the requirements analysis phase, as it provides a concise description of the functional requirements of an IT system. (Laurent Piechocki, 2007, p. 54) . In the context of this study, the use case diagram helps to identify the various actors involved in the stock management system, as well as the functionalities associated with them. Actors may include, for example, management staff, stock managers or other authorised users of the system. The use cases, for their part, correspond to the various operations that these actors can perform, such as managing products, recording goods received and dispatched, managing supplier orders, monitoring stock levels and viewing or generating management reports. The use case diagram therefore facilitates a comprehensive understanding of the system's expected functionality. It helps to define the functional scope of the application, clarify the responsibilities of the various stakeholders and serve as a basis for the design of other UML models, notably class diagrams. Within the context of this research, its use thus helps to ensure a better alignment between the requirements expressed by users and the functionalities incorporated into the developed IT solution.

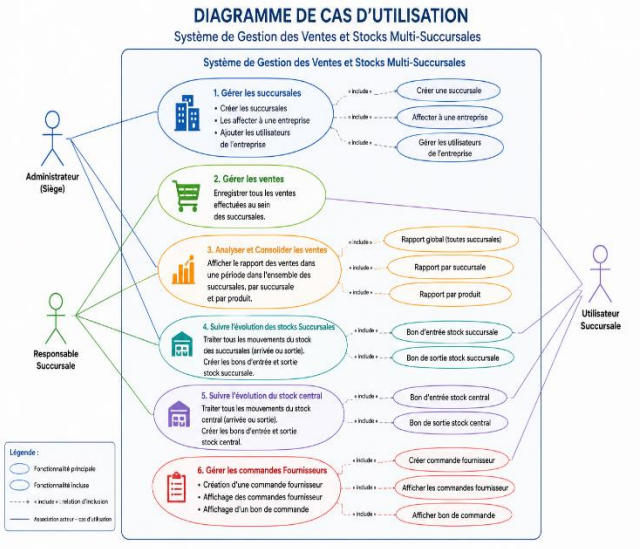

Figure 2 : Use Case Diagram

IV.1.4. Static context diagram

A static context diagram is a graphical representation that shows a system within its environment, identifying the external actors or elements that interact with it, as well as the flows of information exchanged. The static context diagram is a modelling tool that provides a comprehensive yet simplified representation of the boundaries of an information system and its interactions with external entities. It highlights the system under consideration at the centre of the model, the external actors or systems surrounding it, and the data or information exchanged between them. Unlike diagrams describing the internal workings of the system, the static context diagram focuses primarily on the relationships between the system and its environment, without going into detail about internal processes. (Dr Slim Mesfar, 2019) For our Multi-Branch Sales and Stock Management System, the system itself is the central element. Surrounding it are, in particular:

- User: logs into the system and carries out operations;
- Branch: transmits and receives information relating to sales and stock;
- Product: provides or receives information relating to products;
- Supplier: handles orders and deliveries;
- Stock: relates to stock receipts, issues and movements;
- Sales: relates to sales transactions and their details;
- Supplier order: relates to orders placed with suppliers;
- Report: enables the generation of various management reports and statements.

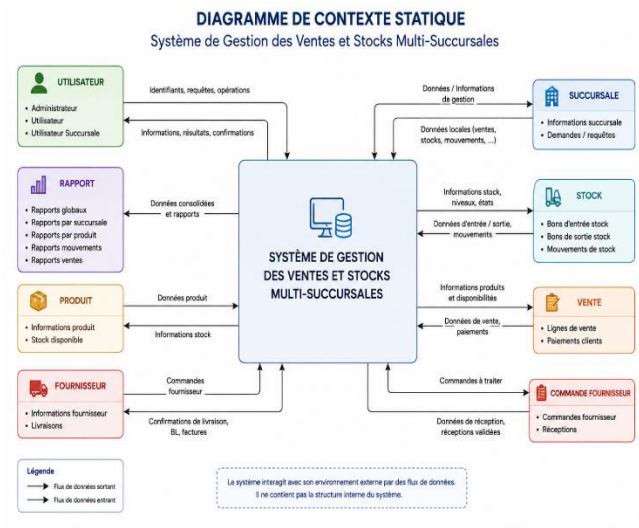

Figure 3 : static context diagram

IV.1.5. Class diagram

A class diagram is a UML diagram used to represent the static structure of a system**.** It shows the classes**,** their attributes**,** their methods and the relationships between the classes. It is a static diagram of the Unified Modelling Language (UML) that represents the structure of an IT system through the various classes that comprise it, their attributes, their methods and the relationships between them. It is an essential tool in object-oriented analysis and design, as it enables the elements of the domain under study to be translated into structures that can be implemented in a computer application. In the context of this study, the class diagram is used to model the main entities involved in the stock management system, such as products, suppliers, orders, stock movements and users. Each class groups together the properties and operations associated with it. The relationships between classes, in turn, represent the structural interactions between the system's various entities, notably associations, aggregations, compositions and inheritance relationships (Laurent Piechocki, 2007) . Thus, the class diagram constitutes a conceptual and technical representation that serves as a reference for database design and application development. It also facilitates understanding of the system's architecture, promotes better organisation of functionalities and helps to ensure consistency between requirements analysis, design and the implementation of the IT solution.

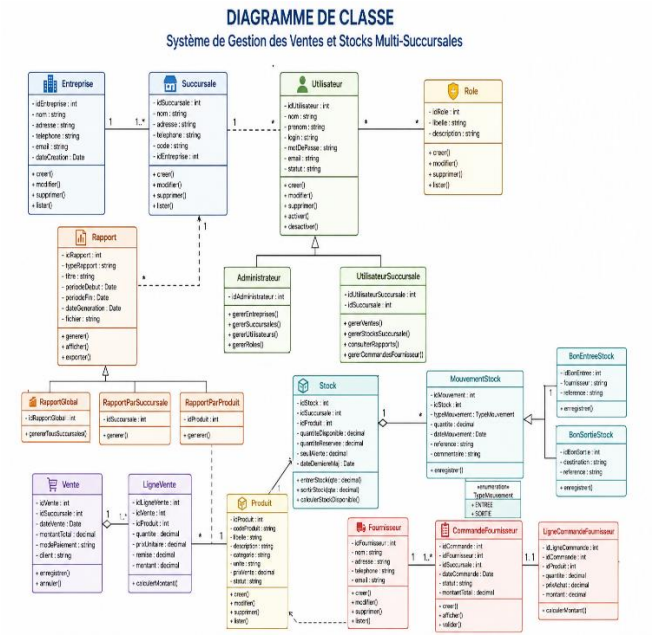

Figure 4 : class diagram

IV.1.6. The state-transition diagram

A state transition diagram is a UML diagram used to represent the different states that an object or system can be in, as well as the transitions that allow it to move from one state to another**.** Also known *as a state machine diagram*, it describes the dynamic behaviour of a system. It shows how the system evolves in response to events that occur (Joseph Gabay, 2008)
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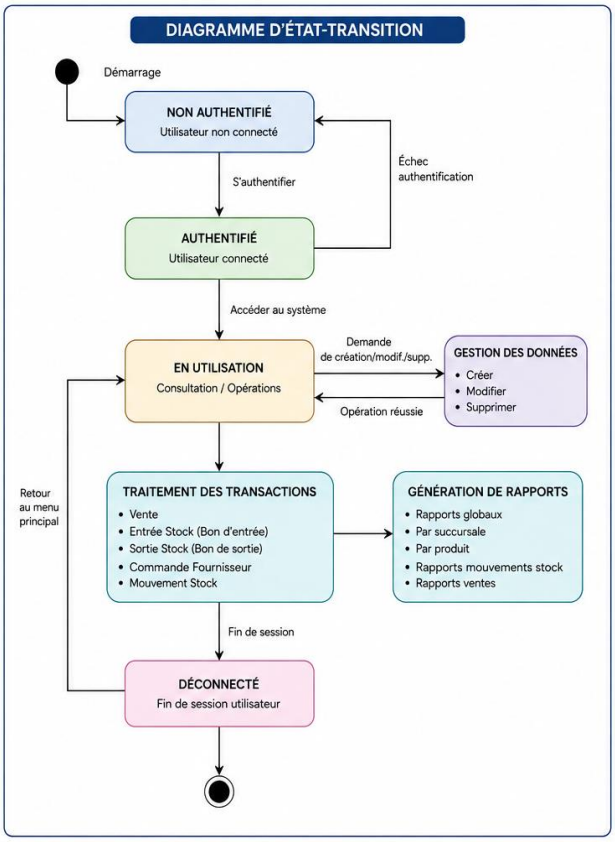


Figure 5 : state-transition diagram

IV.1.7. The activity diagram

The activity diagram is a UML diagram used to represent the sequence of a process or activity**,** from its starting point to its completion. It shows the various actions carried out, the decisions, the conditions, and the order in which the activities are executed. The activity diagram describes the dynamic behaviour of a system, emphasising the sequence of operations. It therefore provides a graphical representation of how a process unfolds, which actions are carried out and which decisions may alter its course. (Joseph Gabay, 2008)

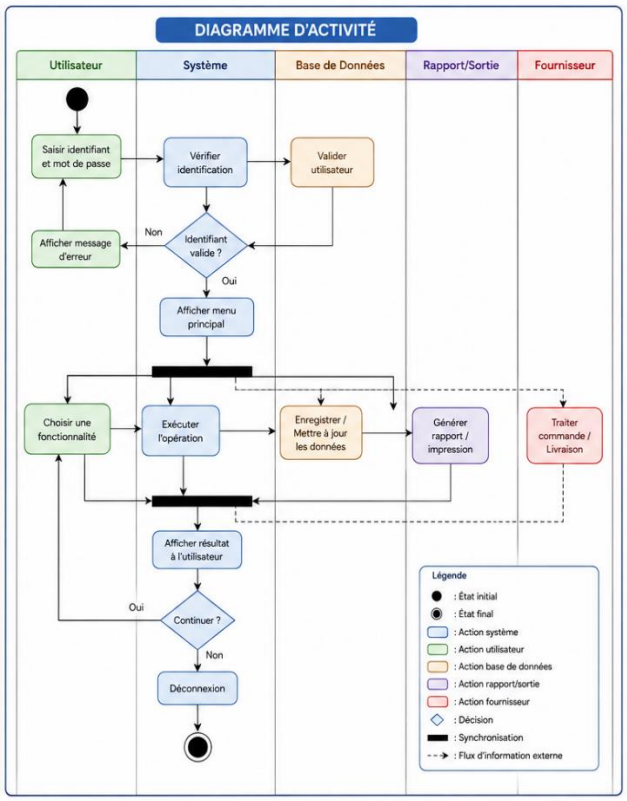


Figure 6 : The activity diagram

V. The Input Form

The input form is a user interface that enables data to be entered, collected and recorded in an information system. It serves as a means of interaction between the user and the application, facilitating the entry of the information required for the system to function. Data entered via this form is generally checked and validated before being stored in the database, in order to ensure its consistency, accuracy and integrity. (Narvarth, 2012) . For the purposes of this study, the data entry form is used to record various details relating to stock management and the operations carried out within the organisation. In particular, it enables the entry of information concerning products, suppliers, orders, quantities received and stock receipts. Each field on the form corresponds to a piece of data required to process the relevant transaction. The entry form is therefore an essential component of the developed application, as it ensures the structured collection of data at source. Its use helps to reduce data entry errors, standardise the recording of information and facilitate its subsequent use for the production of stock-out reports and various management reports.

V.1. Supplier Order Form

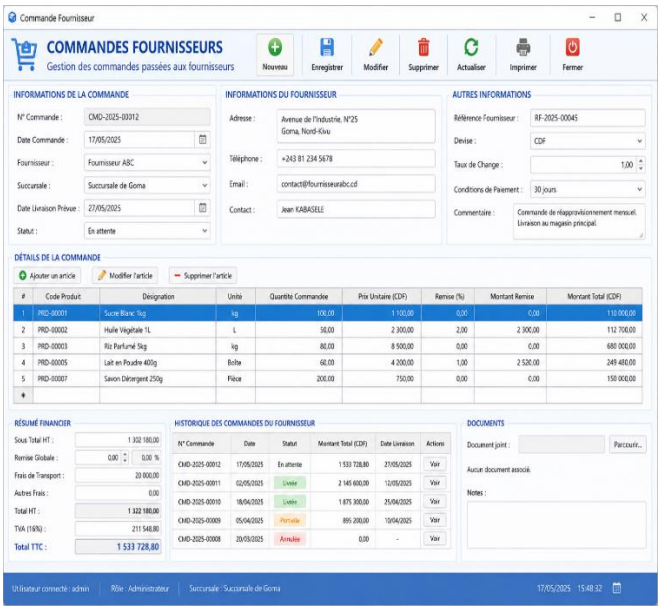


Figure 7 : Supplier Order Form

V.2. Stock Movement Form

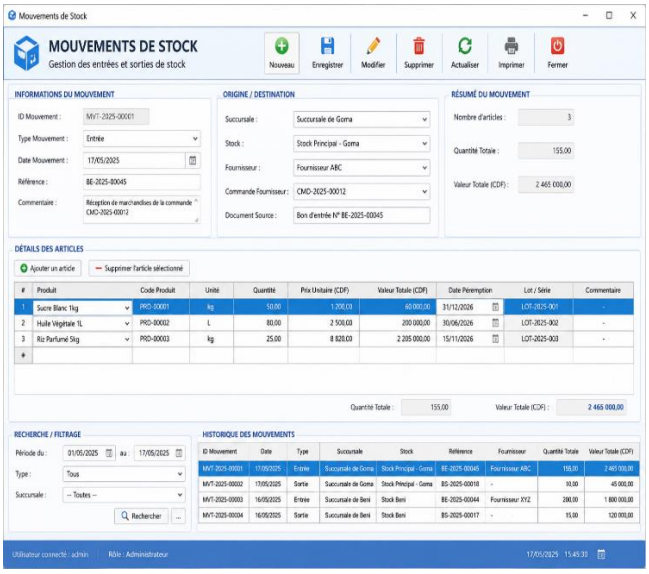
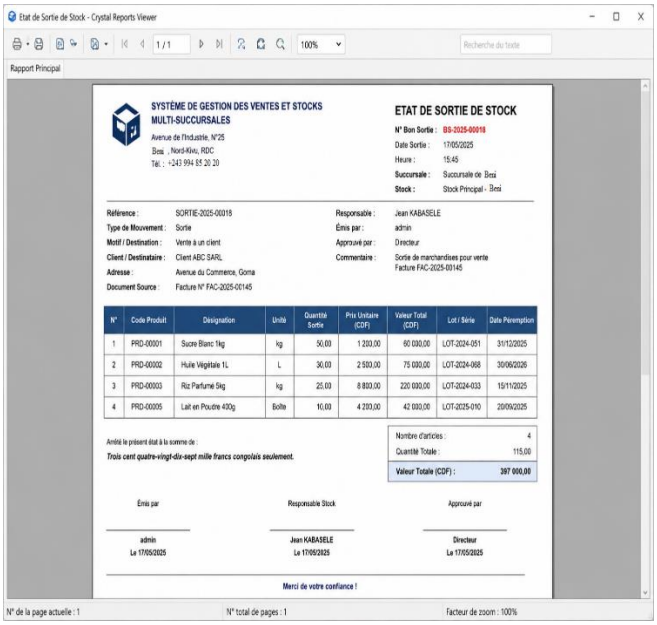


Figure 8 : Stock Movement Form

VI. The Issue Report

The output report thus plays an important role in the decision-making process, as it facilitates the viewing, monitoring and analysis of the information generated by the system. It also helps to ensure better traceability of the operations carried out and provides managers with reliable information for monitoring and managing stock levels. In the application developed, these reports can be generated and printed from the

data stored in the database, in particular using a reporting tool such as Crystal Reports.



General conclusion

At the conclusion of this study, which focused on the **design of an automated information system for sales management in a multi-branch organisation**, it is clear that control, availability, reliability and the sharing of information are essential factors in effective sales management. The geographical dispersion of the branches does indeed give rise to difficulties relating to the flow of information, stock monitoring, supply management, and the analysis and consolidation of sales. These difficulties can limit managers' ability to obtain a comprehensive overview of the company's situation in a timely manner. In light of this issue, the aim of the study was to propose an IT model suited to multi-branch retail organisations, capable of improving the management of operations and the sharing of information amongst the various managers. To this end, the analysis identified the key functionalities required for the system, notably branch management, sales management, monitoring of central and branch stock levels, order management s with suppliers, and the analysis and consolidation of sales. Methodologically, the use of the Unified Process, combined with the UML modelling language, enabled the analysis and design of the system to be structured progressively. The various functional, static and dynamic views helped to represent the interactions between actors, the system's functionalities, the data structures and the system's various behaviours. This approach led, in particular, to the identification of actors and use cases, the textual description of the main scenarios and the modelling of the system's structure using a class diagram. The proposed model thus provides a solution to the main challenges identified in the management of a multi-branch enterprise. In particular, the centralisation of information improves the consolidation of data from the various branches, whilst the tracking of stock inflows and outflows helps to strengthen control over goods. Similarly, the structured recording of transactions provides actionable information for report generation and decision-making support. The study also shows that the automation of operations is a means of improving the traceability of stock movements and the reliability of management information. The mechanisms provided for in the usage scenarios, in particular the verification of payment prior to authorising a stock issue, help to strengthen control over commercial operations. The system can also generate stock records as well as the corresponding goods-in and goods-out notes, thereby providing managers with reliable tools for monitoring activities. Ultimately, the design developed demonstrates that an automated information system, based on a shared data repository and a structured modelling of management processes, can help improve coordination between head office and branches. The proposed model thus provides a basis for the development of an IT solution aimed at strengthening stock control, supply management, sales monitoring and the consolidation of results. It should, therefore, facilitate faster access to information and contribute to more effective decision-making within the company. However, as this study is primarily focused on analysis and design, the full implementation of the solution in a real-world environment remains an important prospect. Further work could focus, in particular, on the actual implementation of the application, its deployment on a suitable network infrastructure, securing data exchanges, and evaluating its performance among users. These avenues would enable the designed model to be tested against the real-world constraints of multi-branch retail businesses and allow for a concrete assessment of its impact on the performance of their sales management.

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