**WEB BASED INTEGRATED PHARMACEUTICAL ORDERING SYSTEM**

**A CASE STUDY OF DEPOT PHARMACEUTICAL**

**BY**

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**DECLARATION**

I NGABONZIZA Serge do declare that this dissertation is my own work. I have to the best of my knowledge acknowledged all authors or sources from where I got information. I further declare that this work has not been submitted in any university or institution for the award of a degree or any of its equivalents.

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Declaration by the supervisor

This research has been submitted with our approval as University of Kigali Supervisor.

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**APPROVAL**

This is to acknowledge that this dissertation has been submitted with my approval.

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# ABSTRACT

WEB BASED INTEGRATED PHARMACEUTICAL ORDERING SYSTEM is seen as a form of electronic commerce which Allows pharmacy to directly ordering drugs Via Internet using a web browser. The Internet has become an essential part of our daily life, and a company realizes that the internet can be to inform partners available items stored in pharmaceutical according to their desire and a total amount that will be paid for a particular demand. The specific objectives are: To develop a database that will stores information about drugs, Pharmacies and pharmaceutical stores, to develop user friendly that allows users of the system to insert, update and deleting to maintain necessary information of the customers, inventory, orders. The literature review was guided by software concept of the system where by a set of things working together as parts of a mechanism or an interconnecting network. The methodology used to develop WEB BASED INTEGRATED PHARMACEUTICAL ORDERING SYSTEM is system development life cycle specifically waterfall model as one of software development methodology. The researcher gathered data by using both techniques the documentation and observation methods. Tools used followed by designing a database on the backend using MYSQL graphical user interface that were designed and developed using HTML, CSS, PHP and JAVASCRIPT. The challenges faced by the organization a researcher has come out with system which will tackle the above mentioned issues on time. Researcher recommends them to use a developed system to better serve and satisfies customer’s needs.

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# CHAPTER ONE: GENERAL INTRODUCTION

## Introduction

Now days Information and communication technology (ICT) is improved in different fields of our day to daily activities where computer today is integral part of everyday life. And the research is conducted to the collaboration between private pharmacies and pharmaceutical warehouse as well as pharmaceutical industry is nowadays extending its limits where a workforce between both side is performed, actually pharmacy orders drugs using requisition paper where the Lawn Drugs Application (LDA) requires the medicine and quantities finally takes the way forwarding to the pharmaceuticals without awareness of unit prices per each quantity bases. the process of acquiring the medicine makes sense partially, the reason why I have tried to develop a helpful information system (IS) which should be useful in the pharmaceuticals industry. Where prescription process won’t longer waste time because IS provides the referral interface on which the LDA should first make sure if products are available in the pharmaceutical warehouse even the prices should be fixed.

## 1.1Background of the study

A world without the Internet is difficult to imagine. The global network affects almost every aspect of our lives. Internet technologies are changing rapidly. At the same time, they alter the functioning of the economic, social and institutional entities. People have been using the Internet for growth of e-commerce which is projected to overtake sales growth at brick-and-mortar stores over the next five years. Therefore, in contemporary marketplaces, e-commerce is no longer an auxiliary channel or strategy; rather, it has become a part of the generic business strategy especially in the field of selling and promoting product so that customers would be aware of any business performance whether in service range or product one. (Michael 'Mike' ,19 April 2013)

The beginning of pharmaceutical industry in word traces its origin to two sources: apothecaries that moved into wholesale production of drugs such as morphine, quinine, and strychnine in middle of the 19th century and dye and chemical company that established research labs and discovered medical application for their products starting in the 1880s.

The value of Africa’s pharmaceutical industry rose from $4.7 billion in 2003 to $20.8 billion in 2013.In many African countries, generic drugs are gaining market share at the expense of over-the-counter and branded products. In South Africa, Egypt, Algeria, Morocco, Nigeria, and Kenya, generics grew at an average CAGR of 22.3 percent between 2004 and 2011, considerably faster than the 13.4 percent for pharmaceuticals.( africa.businesschief.com)

The National Pharmacy Council of Rwanda is an independent statutory organization accountable for the regulation of registered pharmacy professionals and it plays an advisory role to the Ministry of Health and the pharmacy institutions training programmers on all matters related to the pharmacy profession. It was set up by the Law No 45/2012 of 14/01/2013 relating to the organization, functioning and competence of the NPC.

Depot pharmaceutical cannot be said with certainty that the introduction of e-commerce in the shop is a revolution for its employees and managers. It depends on the markets in which the company operates, and on customers served by the shop prior to the introduction of e-commerce as the shop provides different types of medicines that are located in Rwanda not mention the fact that the shop is near the border of DRC which shows how big the market can be extended by attracting even those who are in distance through the integration of e-commerce in the shop’s activities, Due to quarantine the Depot pharmaceutical was strongly affected as the people's way of buying items has changed. The situation has persisted long enough for these patterns to become ingrained which result in losing customer while other online businesses were in operation, the shop can also offer convenient services such as online shopping combined with in-store pickup. Once the online trading system will be in operation in the shop definitely it will become a brick-and-mortar business, knowing that combining with a digital experience can improve the overall of the in-store transaction as well as online trading or shopping. Starting with an easy to navigate website, the system can make it convenient for customers to do research, check options and specifications, and anything else that's relevant online.

Depot pharmaceutical which is the researcher case study is located in Kigali citywhich is growing fast and a number of new pharmacy are starting and pharmacist (LDA) a big number of people and the implemented in order to serve and save either the life of people who are probably needs our services, and more pharmacies make drugs ordering more patients are being healed.

# 1.2 Problem statement

Depot pharmaceutical is one of the known provider’s medicines in Kigali. Until Today they are still operating while using the old business model as the result of those challenges: Time wastage, Poor Marketing, Working limit and Inconvenient data management and LDA (pharmacist) must move to the pharmaceutical warehouse without having any guaranty that the medicine that is searching for is in the stock, Therefore, the time and energy is waste for the pharmacist. This causes researcher to conduct a research to solve them. Surely, Depot pharmaceutical needs an online platform for advertising their available medicines to avoid customer time wastage, a digital way of recording and storing their data and the LDA (pharmacist) should first make sure if the medicines are available in the pharmaceutical even the prices should be fixed.

This is also important to determine the medicine that are demanded more from the customers so that Depot pharmaceutical can be prepared to import more for that type of medicine.

# 1.3. Objectives of the study

## 1.3.1 General objective

The main objective of this project is to design and implement a WEB BASED INTEGRATED PHARMACEUTICAL ORDERING SYSTEM that will help Depot pharmaceutical to manage pharmacy record.

## 1.3.2 Specific Objectives

The current study will focus on the following objectives:

* To develop a database that will store information about medicine, pharmacies and pharmaceutical store,
* To develop user friendly interfaces that allows users of the system to insert, update and deleting to maintain necessary information of the customers, inventory, orders and track the Process.
* To develop a Web based System that will deals with the management of the products, to facilitate payment and generate reports.

# 1.4. Scope of the project

## 1.4.1. Content scope

This research dries with the design and implementation of WEB BASED INTEGRATED PHARMACEUTICAL ORDERING SYSTEM that are more and more appreciated by the pharmacy now appreciate the convenience of ordering medicine online.

## 1.4.2. Geographical scope

The study was done at Depot pharmaceutical which is located in Rwanda, Kigali, Nyarugenge.

## 1.4.3. Time scope

The research focused on the date on 2021 to 2023, a period of 2 years were considered because Depot pharmaceutical was there operating using of forms was being considered as the solution by that time being in pharmaceutical warehouse.

## 1.5. Project Methodology

This project entitled: WEB BASED INTEGRATED PHARMACEUTICAL ORDERING SYSTEM has been developing since 2021 by using Observation as well as Documentation as a data collection tools both to collect requirement and useful information, waterfall mode has been used as software development methodology and at the end used SSADM as structured system analysis and design methodology.

## 1.6. Significance of the study

## 1.6.1. Personal Interest

Personal important includes:

To improve professional capacity by using the knowledge acquired from class to generate solution to a given problem found around our community and country wide. Implementing this project successfully allows the researcher to gain knowledge and experience to the relevant technology area.

## 1.6.2. Public Interest

Family connection system is a productive application to families with in our community especially those near university of tourism, technology and business studies, implementation of this system will facilitate the community in creating a well-organized society that can deal with their own problems especially dealing with controlling behavior growth of their own kids, promotion of family members who are deeply in a certain crisis like financial crisis.

Apart from academic institutions, this system may be used even in other organizations like hospital, military, and others organization.

## 1.6.3. Institution Interest

The study will be significant to University of Kigali (UoK) especially to the students who may have interest in studying in this field since the project report deposited in the school library and at the end it served as reference to other library users and researchers as well.

## 1.7. Limitations of the study

Since the study was using interview method and questionnaire during study met different limitation among of those are respondent were not freely to answer question set in good and well manner actually they were not of aware of the research solving their problems so to respond become problem also seeing someone conducting interview to them it was difficult somehow but also lack of capacity in terms of information from our interviewee as they were of different age respondents.

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# CHAPTER TWO: LITERATURE REVIEW

## 2.0 Introduction

This chapter provides an idea on the system the researcher was designed. Moreover, it provides a deep definition and description of key terms and related literatures to the study topic in order to reach by the side of conceptual interpretation. The purpose of this chapter is to stretch a brief description of the hypothetical concepts and essentials that can be used during the development of this system.

It provides meanings and features of technologies which is used. The description provided an overview on those concepts which leaded researcher on the development of the system.

## 2.1. Definition of key terms

**Web**

The Web is the common name for the WORLD WIDE WEB, a subset of the Internet consisting of the pages that can be accessed by web browser. Many people assume that the Web is the same as the Internet, (tachopedia).

**Based**

Used to form adjectives showing the main place or area which something or someone work , lives, or does business.(Cambridge dictionary 2020)

**Integrated**

Thing or people that are integrated have been brought together, so that they live or work together. They’re no longer apart or segregated. (vocabulary.com)

**Pharmaceutical**

Relating to medicinal drugs, or their preparation, use, or sale (lexico.com)

**Ordering**

A taxonomic category of organisms ranking above a family and below a class is [reflexive](https://www.collinsdictionary.com/dictionary/english/reflexive), ant symmetric, [transitive](https://www.collinsdictionary.com/dictionary/english/transitive), and connected, as less than or equal to on the [integers](https://www.collinsdictionary.com/dictionary/english/integer).( [Collins English Dictionary](https://www.collinsdictionary.com/dictionary/english))

**System**

A system is a set of interacting or interdependent components forming an integrated whole or a set of elements and relationships which are different from relationships of the set or its elements to other elements, (Marshall, 2014).

**2.2. The body**

**2.2.1. Empirical review**

The pharmaceutical industry has witnessed significant advancements in recent years, with a growing emphasis on digitalization and automation. In this context, web-based pharmaceutical ordering systems have gained prominence as they promise to streamline the ordering process, enhance inventory management, and improve overall operational efficiency for pharmaceutical companies.

However, when examining the specific case of Depot Pharmaceutique in Kigali, Nyarugenge, it becomes evident that there are several empirical gaps and challenges:

**Limited Accessibility**: One of the primary empirical challenges faced by Depot Pharmaceutique is the limited accessibility to a reliable internet connection in some areas of Kigali. This poses a significant obstacle to the successful implementation and utilization of a web-based ordering system.

**Data Security Concerns:** The empirical data reveals that there are concerns regarding data security and privacy in the pharmaceutical sector. Given the sensitive nature of pharmaceutical data, it is imperative that any web-based system ensures robust data encryption and protection against potential cyber threats.

**Vendor Adoption:** The empirical analysis indicates that some pharmaceutical vendors in the region may not be technologically adept or willing to adopt a web-based ordering system. This resistance from suppliers can hinder the successful integration of such a system into the supply chain.

**User Training:** Training pharmacy staff and suppliers to effectively use the web-based system is another empirical challenge. Adequate training is crucial to ensure smooth operations and minimize errors during the ordering process.

**2.2.2 Theoretical Review**

The theoretical framework for a web-based pharmaceutical ordering system is built upon several key concepts and principles:

**E-commerce:** Theoretical models emphasize the integration of e-commerce principles into pharmaceutical supply chains. This includes concepts such as online ordering, electronic payments, and digital catalogs.

**Inventory Management:** Theoretical models highlight the importance of real-time inventory tracking and management to optimize stock levels, reduce carrying costs, and prevent stockouts or overstock situations.

**Data Security:** Theoretical discussions stress the need for robust data security measures, including encryption, access controls, and authentication protocols, to safeguard sensitive pharmaceutical data.

**User Adoption:** Theoretical models often emphasize the significance of change management strategies to encourage user adoption and minimize resistance to new technology within organizations.

**2.2.2.1Existing systems**

The existing systems, especially those we have seen, have some weakness and gaps to be filed by a new system.

The current system was manual because it is done using the paper-based system and after the analysis of the current system we found:

1. Data are recorded in notebooks (manual records of information).
2. Manual searching for pharmaceutical location
3. Pharmacist have to directly come to the office requesting services
4. They are not secured.
   * + 1. **Proposed system**

The proposed solution is to create a web based integrated pharmaceutical ordering system that will improve the entire company handling process by providing an automated system and accurate an drugs ordering system cycle that is error-free efficient and update real-time. Through this application any pharmacist (LDA) who is interested in dugs ordering process can register himself in the same way if any Pharmacy wants to register itself with site that can also register. Admin is the main authority who can do addition, add employee (LDP), deletion, and modification if required.

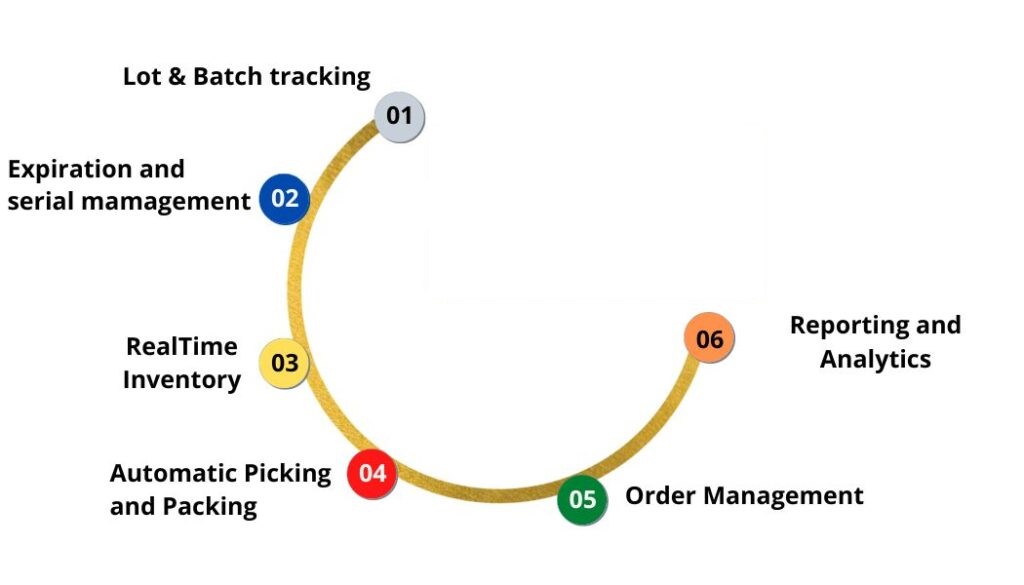
**2.2.3** **Summary of the Gap**

In summary, the transition from an existing manual pharmaceutical ordering system to a proposed web-based solution offers substantial benefits in terms of efficiency and accuracy. However, to realize these advantages, it is imperative to address the digital divide, enhance data security, encourage vendor adoption, provide user training, and implement effective change management strategies. Closing these gaps will be essential to the successful implementation and utilization of the web-based pharmaceutical ordering system at Depot Pharmaceutique in Kigali, Nyarugenge.

### Conceptual framework

A conceptual framework is an analytical tool with several variations and contexts. It is used to make conceptual distinctions and organize ideas. Strong conceptual frameworks capture something real and do this in a way that is easy to remember and apply.

Figure 1: Conceptual Framework



# CHAPTER 3: RESEARCH METHODOLOGY

## Introduction

This chapter of research design and methodology attempts to indicate the source of data, the methods, scheduling and techniques used to collect data that was analysed and interpreted to develop such project.

## 3.1 Research design

Research design is like a layout for conducting a study with maximum control over factors that may interfere with the validity of the outcome and findings. A research design is the set of methods and procedures used in collecting and analyzing measures of the variables specified in the research problem research. (Andrew, 2018).

Research design brings about the overall strategy that a researcher chooses to integrate the different component of the study in a coherent and logical way, thereby, ensuring effective address of research problem; it constitutes the blueprint for the collection, measurement, and analysis of data.

## 3.2 Population and selection of the sample

### 3.2.1. Depot Pharmaceutique

Located in the heart of the capital town of Rwanda, Kigali, Depot Pharmaceutique is a warehouse that sell drugs to local pharmacy. The pharmacist is required to go there to ask for information, checking if the pharmacy is qualified, register, pay, and choose what drugs he want to buy and the times of the day he will attend. After that, the pharmacist waits for a given time then come back to get the answer if allowed to buy, and receives the schedule for the day and the delivery time. Sometimes the schedule causing the change of the program to buy, or the pharmacist waits until those he finds the drugs he is looking for .

**3.2.2. Population of the study**

The following table gives the details that highlight the general situation of all concerned in Depot pharmaceutique

*Table 1: Population of the study*

|  |  |  |  |
| --- | --- | --- | --- |
| **Categories of the study** | **Male** | **Female** | **Number of concerned by category** |
| Suppliers | 7 | 3 | 10 |
| Warehouse staff | 4 | 3 | 7 |
| Pharmacists | 4 | 3 | 7 |
| **Total concerned** | **15** | **9** | **24** |

**Source:** **Depot pharmaceutique Secretary, 2023**

The table 1 shows that the actual client in Bright Education Center is 10, with 7 males and 3 females. The number of warehouse staff is 7 and the number of pharmacist is 7. Hence, the number of whole concerned is 24 with 15 males and 9 females.

Moreover, because of some financial, material and temporary limits for a good and effective realization of this study without forgetting that we cannot be able to reach every person concerned by this study, we have been so obliged to operate with the sample.

## 3.3. Sample size

A sample is a subset of the population and representative sample must have properties that best represent the population so as to allow for an accurate generalisation of results. (BLESS&HIGSON-SMITH 1995:88). During this study, I will use the simplified formula of Javeau. C (1985) which state that n=NX/X+N-1 where, n= sample size, N= population size, the value of X is a number between 1 and [(N /2)-1] which determines the accuracy and precision of the simple size. The sample size is most accurate and precise if the value of X is closer or equal to [(N /2)-1]. For my case, let x= 49, so, after the relevant calculation the sample size is equal to 33. Hence, the Table 2 show the size of the sample of our study.

Table 2:Sample size

|  |  |  |  |
| --- | --- | --- | --- |
| **Categories of the study** | **Male** | **Female** | **Number of concerned by category** |
| Suppliers | 7 | 1 | 8 |
| Warehouse staff | 2 | 4 | 6 |
| Pharmacists | 6 | 5 | 11 |
| **Total concerned** | **15** | **10** | **25** |

The table 1 shows that the sample size is composed by 8 suppliers, with 7 males and 1 females. The number of warehouse staff is 6 and the number of pharmacist is 11. Hence, the number of the sample size is 25 with 15 males and 10 females.

## 3.4. Sources of data

I used both primary and secondary sources.

### 3.4.1. Primary data

We employed primary research methods by the use of questionnaires, interviews and observation to collect data from respondents.

### 3.4.2. Secondary data

Secondary data refers to information usually got from documented sources; therefore the researcher used textbooks from different libraries, government reports and websites.

## 3.5. Techniques of data collection

Methods were not sufficient themselves to get the right information. There must be equally techniques applied in establishing instruments used to get information. COHEN and MARION (1985:269) argue that a researcher can decide to use more than one method for data collection, commonly known as triangulation. Therefore, in this research the following instruments were used: questionnaires, interviews and observation.

### 3.5.1. Questionnaire

According to BROUNE (2003) a questionnaire is a printed list of questions to be filled in either personally by the respondent or by an interviewer.

A questionnaire is an instrument that consists of asset of questions whereby respondents are required to provide information by writing. The questionnaire was both closed and open.

They were administered to the selected members of the sample size. They were closed because they consist of multiple choice questions and required definite answers like YES or NO. They were equally open whereby respondents were required to provide information according to their own opinions and feelings in blanks or spaces given.

### 3.5.2. Interview schedule

According to Cambridge international dictionary of English defines interview as a series of questions in a formal situation usually in order to obtain information about them. Thus it is a face-to-face talk or conversation with the passengers we wanted to get information. It is also considered as a series of questions in a formal situation usually used in order to obtain information about them. The method assumes that the respondents to be interviewed have information required. They can understand the questions and feel free to give necessary responses.

### 3.5.3 Documentary technique

That technique refers to get information from documents. Documents are materials, which contain the information about a phenomenon that researcher wish to study (Cambridge international dictionary of English). In this study, the documents target on either international or national reports, different literatures about the subject and then previous researches related to the topic.

## 3.6. Methods of data analysis

### 3.6.1 Qualitative method

Qualitative method derives data from observation, interviews or verbal interactions and focuses on the meanings and interpretations of the participants.

### 3.6.2 Quantitative method

Quantitative method is based on interpreting data statistically through questionnaires, tables and percentages to help the researcher to determine the opinion of a specified group known as objects. By using this method, I analyzed the different data collected to derive at the exact data required. After analyzing and collecting the data, it was put in tables to show (in the next chapter) the responses to particular questions posed during the data collection.

## 3.7 Validity and Reliability

In this work, content validity and reliability of questionnaire/survey as a significant research instrument tool were tested. Various types of validity were viewed with the goal of validity and reliability improving. Content validity is defined as “the degree to which items in an instrument reflect the content universe to which the instrument will be generalized” (Straub, Boudreau et al. 2004). It is highly recommended to apply content validity while the new instrument is developed. In general, content validity involves evaluation of a new survey instrument in order to ensure that it includes all the items that are essential and eliminates undesirable items to a particular construct domain (Lewis et al., 1995, Boudreau et al., 2001).

## 3.8 Ethical Considerations

My research is guided by a set of principles that designs and practices ethical considerations. When collecting data from people I adhered to a certain code of conduct that work to protect the rights of research participants, enhance research validity and maintain scientific integrity.

Among several ethical issues I paid attention on three that are relevant to my research design, because these issues can overlap with each other.

1. **Voluntary participation:** my participants were free to opt in or out of the study at any point in time.
2. **Anonymity:** I don’t know the identities of the participants. Personally identifiable data is not collected.
3. **Confidentiality:** even if I know who the participants are but I kept that information hidden from everyone else. I anonymized personally identifiable data so that it can’t be linked to other data by anyone else.

## 3.9. System requirements

System requirements are the configuration that a system must have in order for a hardware or software application to run smoothly and efficiently. Failure to meet these requirements can result in installation problems or performance problems. This is a set of documentation that describes the features, functionality, and behavior of inventory management system. It includes a variety of elements that attempts to define the intended functionality required by the system to satisfy their different users. In addition to specifying how the system should behave and what key performance parameters will need to be met by the system.

### 3.3.1 Hardware Specification

* **Hard disk (HD):** This system will be installed in a computer that has at least 10GB of free space before installation and 100 GB on hard disk after installation.
* **Processor:** Inter(R) Core (TM) i5-2450M CPU @ 2.50GHz (4CPUs), -2.5GHz.
* **Memory (RAM):** This system will be installed in a computer that has at least 2GB of RAM.
* **External hard disk:** This system will be carried on a flash disk that has at least 4GB of free space.

### 3.3.2 Software Specification

1. **Operating system:** Windows 7,8 and10.
2. **Language:** Html, Bootstrap 4, Php, MySQL and JavaScript
3. XAMPP Server
4. Adobe Dreamweaver Text Editor
5. Browser. (Internet Explorer, Opera Mini, Google Chrome, Firefox and others).
6. Front End Software: HTML, CSS and some JavaScript
7. Back-end Software: PHP, MySQL

## 3.10. Functional requirements

The functional requirement of an automated telecom services and inventory system describes what a software system should do. Functional requirements specify the functions that a system or system component must be able to perform. It can be documented in various ways. The most common ones are written descriptions in documents and use cases.

**User Registration and Authentication (Functional)**

* The system shall allow users to register with their unique username, password, and contact information.
* Users shall be required to log in to access the ordering system.
* Authentication shall be role-based, distinguishing between warehouse staff, procurement officers, pharmacists, and suppliers.

**Product Catalog Management (Functional)**

* The system shall provide an interface for administrators to manage the product catalog.
* Warehouse staff shall be able to add, update, and remove pharmaceutical products from the catalog.
* Product details shall include name, description, unit price, and availability status.

**Order Placement and Tracking (Functional)**

* Authorized users shall be able to create purchase orders by selecting products from the catalog.
* Users shall specify the quantity of each product, and the system shall calculate the total cost.
* The system shall generate unique order IDs and timestamps for each order.
* Users shall be able to track the status of their orders (e.g., pending, processing, delivered).

**Inventory Management (Functional)**

* The system shall maintain an inventory database that automatically updates as orders are placed and received.
* Warehouse staff shall be notified when inventory levels fall below a predefined threshold.
* The system shall prevent users from ordering products that are out of stock.

**Notification and Alerts (Functional)**

* The system shall send email notifications to users upon order confirmation, shipment, and delivery.
* Automatic alerts shall be generated for procurement officers when stock levels are low.

**Non-Functional Requirements**

Non-functional requirements are requirements that are not directly concerned with the specific functions delivered by the system. They may relate to emergent system properties such as reliability, response time and store occupancy. They may specify system performance, security, availability, and other emergent properties. This means that they are often more critical than individual functional requirements. System users can usually find ways to work around a system function that doesn’t really meet their needs. However, failing to meet a nonfunctional requirement can mean that the whole system is unusable.

Non-functional requirements needed in this nearby pharmacy identification system are identified as:

**Performance (Non-Functional)**

* The system shall respond to user actions within 2 seconds under typical load conditions.
* It shall support concurrent access by at least 100 users without significant performance degradation.

**Usability (Non-Functional)**

* The user interface shall be intuitive and user-friendly, with clear navigation and proper labeling.
* Users shall be able to complete common tasks (e.g., placing an order) without extensive training.

**Security (Non-Functional)**

* User data and sensitive information, such as login credentials and order details, shall be encrypted during transmission.
* The system shall implement access controls to ensure that users only have access to features and data appropriate to their roles.

**Availability (Non-Functional)**

* The system shall be available 24/7, with scheduled maintenance windows communicated in advance.
* The expected uptime shall be at least 99.9% annually.
* Scalability (Non-Functional)
* The system architecture shall be designed to scale horizontally to accommodate a growing user base and increasing data volume.

**Compliance (Non-Functional)**

* The system shall comply with relevant data protection regulations, such as GDPR, and industry standards for pharmaceutical data management.

**Accessibility (Non-Functional)**

* The user interface shall be accessible to users with disabilities, following WCAG (Web Content Accessibility Guidelines) standards.
* These functional and non-functional requirements provide a foundation for the development and evaluation of a web-based integrated pharmaceutical ordering system for Depot Pharmaceutique. Depending on specific project goals and constraints, additional requirements may be necessary.

## 

## REFERENCE

1. R. Gennaro, et al. (eds.), *Remingtonâ™s The Science and Practice of Pharmacy,* 20th ed., Mack Publishers, Easton, PA, 2000.
2. K. Taketomo, J. H. Hodding, D. M. Kraus (eds.), *APhA Pediatric Dosage Handbook,* 11th ed., Lexicomp Inc., Hudson, OH, 2004.
3. S. Tatro, *Drug Interaction Facts,* Facts and Comparisons, St. Louis, MO, 2005. S. L. Traub (ed.), *Basic Skills in Interpreting Laboratory Data,* American Society of Hospitals, Bethesda, MD, 1996.
4. J. T. DiPiro, T. L. Schwinghammer, B. Wells (eds.), *Pharmacotherapy: A Pathophysiologic Approach,* 5th ed., Appleton & Lange, Stamford, CT, 2002.
5. J. D. Grabenstein, *Immunofacts: Vaccines and Immunologic Drugs,* Drug Facts and Comparisons, St. Louis, MO, 1995.
6. J. G. Hardman, L. E. Limbird (eds.), *Goodman &Gilmanâ™s Pharmacological Basis of Therapeutics,* 10th ed., McGraw Hill, New York, NY, 2001.
7. K. Novak (ed.), *Drug Facts and Comparisons,* Facts and Comparisons, St. Louis, MO, 2005.
8. G. K. Siberry, *The Harriet Lane Handbook,* 17th ed., Mosby Year Book, St. Louis, MO, 2004.
9. G. Briggs, R. K. Freeman, S. J. Yaffe (eds.), *Drugs in Pregnancy and Lactation,* 7th ed., Williams & Wilkins, Baltimore, MD, 2005.
10. M. E. Winters, *Basic Clinical Pharmacokinetics,* 3rd ed., Applied Therapeutics Inc., Vancouver, WA, 1994.
11. R. R. Berardi, L. V. Allen, E. M. DeSimone (eds.), *Handbook of Nonprescription Drugs,* 14th ed., American Pharmaceutical Association, Washington, DC, 2004.
12. P. D. Hansten, J. R. Horn (eds.), *Drug Interactions: Analysis and Management,* Drug Facts and Comparisons, St. Louis, MO, 2004.
13. Shyam, Radhey (2009). Clinical Child Psychology. Delhi: Gyan Books. pp. 113–115. [ISBN](https://en.wikipedia.org/wiki/International_Standard_Book_Number) [9788178357614](https://en.wikipedia.org/wiki/Special:BookSources/9788178357614).
14. Wagner, Michael (2010), SQL/XML: 2006 – Evaluierung der StandardkonformitätausgewählterDatenbanksysteme, DiplomicaVerlag, [ISBN](https://en.wikipedia.org/wiki/International_Standard_Book_Number) [978-3836696098](https://en.wikipedia.org/wiki/Special:BookSources/978-3836696098).
15. Zickuhr, K. (2010). Generations 2010. Pew Internet and American Life Project. Retrieved from <http://pewinternet.org/Reports/2010/Generations-2010.aspx>

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# APPENDICES:

## Appendix 1: Time frame for the accomplishment of the dissertation

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Stages** | July | August | September | October | November | December |
| Identification of topic |  |  |  |  |  |  |
| Review collection |  |  |  |  |  |  |
| Writing research proposal |  |  |  |  |  |  |