

Efficient Management of Pharmacy Operations through Operations Research Techniques

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ABSTRACT: This article discusses the use of operations research techniques to improve the management of pharmacy operations. In the context of Pharmacy Management Information Systems, some of the OR techniques that could be used are: Linear Programming (LP), Queueing Theory, Simulation, Decision Analysis, Forecasting, Network Analysis. The aim of applying operations research is to make it easier for pharmacy owners to manage their businesses by streamlining the process through the use of mathematical and quantitative methods. Operations Research (OR) is a problem-solving approach that involves analyzing and optimizing complex systems. In the context of Pharmacy Management Information Systems (PMIS), the study covers a wide range of areas such as sales inventory, stocks inventory, purchases (orders, receipts), payroll, accounting, financial management, sales reports (daily, monthly, yearly), and the pharmacy prescription book (for senior citizens and persons with disabilities). Additionally, a point of sale (POS) system has been built into the application, which can be used in both single and multi-user environments. The Pharmacy Automate or PMIS is a Windows-based operating system that can significantly improve pharmacy business operations by automating the entire process and helping owners keep track of their inventory and other important aspects of the business. The use of OR techniques has proven to be very useful in the more complex fields of pharmacy business operations.

KEYWORDS: Data Analytics, Inventory Management, Operations Research Techniques, Pharmacy Automate

1. INTRODUCTION

In recent years, there has been a significant shift in the way information is collected, stored, and utilized by businesses and governments across the globe. Gone are the days of paper-based systems that were prone to errors and delays; instead, there has been a complete overhaul towards information technology (IT) solutions. While IT has brought about significant advancements in accuracy and efficiency, it cannot address the underlying issues of personnel capabilities or bureaucratic resistance. Today, IT is an integral part of virtually every fast-paced industry, involving the use of electronic computers and software to securely convert, store, process, transmit, and retrieve information (Amarasinghe, 2024).

The clinical pharmacy management system has been tailored to suit the current scenario, with pharmacists utilizing patient prescriptions as a case study during their routine operations. The system has been shown to significantly enhance the work efficiency of clinical pharmacists, as evidenced by comparing the quality and qualification rates of prescription drugs before and after its implementation (Bao et al., 2013).

At present, the pharmacy management information systems (PMIS) software is being utilized in the Australian Department of Veterans Affairs (DVA) as a robust tool for managing drug-related activities. This innovative software solution is designed

To cater to the specific objectives of the drug management program while ensuring an efficient and effective information management system (Moss et al., 2004). With its user-friendly interface, the PMIS software streamlines the workflow processes of pharmacists, thereby improving overall performance and productivity. Its comprehensive features enable the pharmacists to access up-to-date drug information, monitor patient prescriptions, and maintain accurate drug inventory records, ensuring that patients receive optimal healthcare services. The successful implementation of PMIS in the DVA demonstrates its reliability and usefulness, making it an excellent model for future healthcare systems seeking to improve their drug management programs.

The design and implementation of a web-based pharmacy management system is currently underway, with the primary objective of centralizing business management and monitoring processes. The system aims to minimize issues that arise during day-to-day operations, ultimately enhancing safety and efficiency in the pharmaceutical store while improving accuracy. Currently, the pharmacy relies on a manual system that is challenging to manage, and it is imperative to streamline these processes by adopting a modern, digital solution (Rathnayake, n.d.).

One of the critical issues identified in the problem domain is the manual stock management using paper records, which can lead to inaccurate data and potential errors. By introducing

a digital solution, the system can track the inventory accurately based on expiration dates and available quantities, reducing the risk of errors and wastage. Furthermore, the system aims to reduce the workload of the staff, allowing them to focus on other critical tasks, leading to increased productivity and efficiency. By optimizing the business processes, the pharmacy will have a competitive advantage in the pharmaceutical industry, and the adoption of a modern, web-based management system will increase the value of the business.

Managing inventory can become increasingly challenging when dealing with a large number of product items. To overcome this hurdle, it is essential to conduct product grouping analysis to determine the priority of products. However, this process can be time-consuming and inefficient when done manually. Therefore, the implementation of an inventory management information system that supports the inventory planning process becomes a critical requirement (Gurney, 2005) (Herlambang & Parung, 2021) (Linda et al., n.d.).

The use of an inventory management information system can simplify the process of inventory planning by automating various functions, including product categorization, demand forecasting, and order placement. By utilizing data analysis and forecasting techniques, the system can provide valuable insights into inventory management, allowing businesses to optimize inventory levels, improve efficiency, and reduce costs. In addition, the system can provide real-time inventory tracking, ensuring that products are readily available for sale and reducing the risk of stock-outs.

The integration of an inventory management information system not only simplifies the inventory planning process but also enhances overall operational efficiency. With the ability to track and monitor inventory accurately, businesses can make informed decisions, reduce waste, and maintain customer satisfaction. Therefore, it is crucial to consider the implementation of an inventory management information system to streamline the inventory planning process and remain competitive in today's fast-paced business environment.

One of the critical factors that affect the pharmaceutical supply chain is the imbalance between the demand for medicines and medical equipment and the availability of pharmacies to supply them. However, a more significant issue that exacerbates this situation is the poor implementation of pharmacy accounting information systems. To address this problem, the integration of accounting information systems in pharmaceutical management becomes essential for pharmacies to manage their business operations effectively and efficiently (Mustofa, Ekasari, & Kusmintarti, 2021).

By utilizing accounting information systems, pharmacies can improve their inventory management practices, track sales and expenses, and make informed business decisions. These systems can provide real-time data on inventory levels, enabling pharmacies to respond quickly to changes in demand

and supply. Additionally, accounting information systems can automate routine tasks, such as invoice processing and financial reporting, saving time and reducing the risk of errors.

Moreover, the use of accounting information systems can improve financial transparency, enabling pharmacies to identify and address inefficiencies, reduce costs, and increase profitability. This data can also provide valuable insights for decision-making, including identifying profitable products, adjusting prices, and managing cash flow.

Pharmasoft is a specialized software that focuses solely on the pharmacy management system, designed to provide a web-based solution to small and medium-sized pharmacies, enabling them to manage their operations efficiently and effectively. The primary objective of the system is to minimize the issues that arise during day-to-day operations and increase the value of the business, thus providing a competitive edge in the pharmaceutical industry (Maduranga, 2016).

Pharmasoft is not just limited to pharmaceutical drugs but also supports the management of grocery items. The software is designed to define and manage these items accurately and efficiently, providing convenience to the users of the system.

In the current pharmacy process, there are four main actors involved - the pharmacy owner, the pharmacist, the customer, and the supplier. Pharmasoft streamlines the operations and interactions between these actors, providing a seamless experience that benefits all parties involved. The software automates several critical functions, including inventory management, sales processing, and financial reporting, among others.

Pharmasoft is a user-friendly software that provides an intuitive interface, making it easy for users to navigate and operate. The software is customizable, enabling pharmacies to tailor it to their specific needs and requirements. With Pharmasoft, pharmacies can save time, reduce costs, and increase efficiency, ultimately enhancing their profitability and competitive edge in the market.

The current pharmacy process involves four crucial areas, including Pharmacy Managers, Pharmacy Employees, Suppliers, and Customers. The developed system caters to these areas by allowing different user roles to log in and perform their respective functions. This system is designed to enhance the efficiency and accuracy of the pharmacy process and provide a seamless experience for all users involved.

The administrator role in the system has the authority to create users and assign rights to them, enabling them to generate essential reports for administrative decisions, salary management, and removal of employees. This functionality empowers administrators to make informed decisions and maintain the smooth functioning of the pharmacy.

Pharmacy employees play a critical role in the day-to-day operations of the pharmacy, and the system provides them with a user-friendly interface to manage the maintenance of stocks and order management effectively. The system streamlines the process, reducing waiting times for customers by checking the availability of items and enabling employees

“Efficient Management of Pharmacy Operations through Operations Research Techniques”

to order them promptly. The system also allows pharmacy employees to generate a Purchase Order in case of low item availability, ensuring that the stock is replenished promptly and accurately.

By providing a user-friendly interface and intuitive design, the developed system enhances the efficiency and accuracy of the pharmacy process, saving time and resources and ultimately benefiting the pharmacy's profitability and competitiveness in the market. The system provides real-time updates on stock availability and order status, enabling pharmacy employees to make informed decisions and ensure that customers receive the products they need promptly. In addition, they can search for items by expiration date. So, things that will expire at close dates are noticed (Maduranga, 2016) (Soegoto & Ginanjar, 2018).

The Pharmacy Management Information System (PMIS) software is an integrated and automated system that effectively manages pharmacy products and medications. It streamlines various processes such as stock control, billing management, and reporting, providing pharmacy managers with an accurate and up-to-date overview of their business performance. Through PMIS, pharmacies can easily monitor their costs, revenue, and sales, allowing them to make data-driven decisions that will positively impact their bottom line. The software is designed to provide a holistic and comprehensive view of the business operations, thereby enabling pharmacies to optimize their workflows, increase productivity, and ultimately achieve their business objectives.

The researcher conducted a comprehensive analysis and collected all the necessary requisites for the development of the PMIS. This was done to emphasize the significance of developing and implementing the system in a pharmacy business, and to highlight its benefits to the pharmacy owner.

By conducting operations research on small and large pharmacies, the researcher was able to demonstrate how the successful implementation of the PMIS can improve the management of incoming and outgoing drug stocks, as well as the cash flows of the pharmacy business, on an international scale.

The operations research conceptual framework of the pharmacy business is depicted in Figure 1, which provides a visual representation of the system's ability to streamline operations and enhance business performance. By utilizing this framework, pharmacies can achieve increased efficiency, productivity, and profitability.

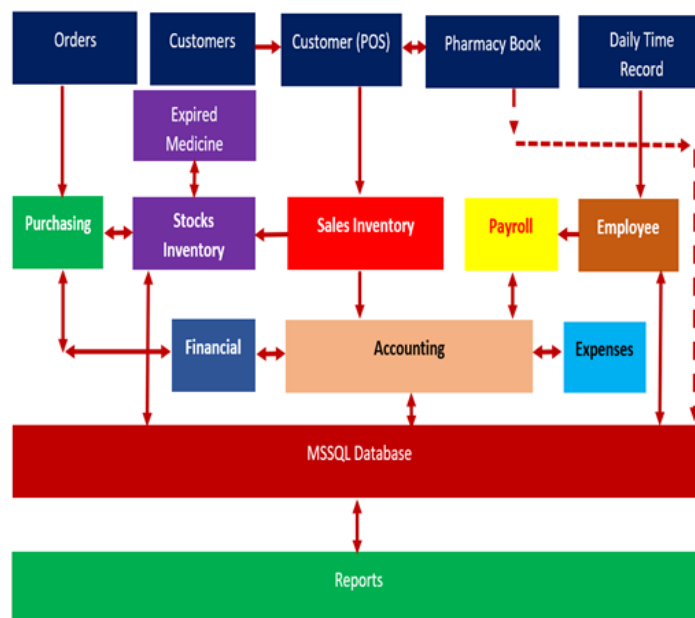


Fig 1. PMIS Operations Research Framework

Objective of the study

The main objective of this research is to assist prospective pharmacy owners in making informed decisions by adopting a PMIS for their pharmacy business instead of relying on manual methods of management. The study is specifically focused on designing and implementing an operations research framework for computerized pharmacy management information systems, utilizing the MSSQL database server as the back-end and Visual Basic .net as the front-end. By implementing such a system, pharmacy owners can benefit from improved accuracy, enhanced safety, and increased efficiency in their day-to-day operations. The utilization of technology can also lead to cost savings and competitive advantages within the pharmaceutical industry. The following are the objectives in this study:

1. The project aims to design and implement a computerized pharmacy management information system that can handle various processes such as orders, customers, sales, stock inventory, daily time records for employees, payroll, drug expiry, pharmacy book, expenses, accounting, and financials.
2. The system will be developed as a desktop application using Visual Basic.net as the front-end and MSSQL as the back-end.
3. The system will be implemented in the pharmacy store to test its functionality and ensure the integrity of the output generated by the system.

2. METHODOLOGY

The methodology employed in this study is deductive, as it is based on an experimental approach using Random Application Development. Rapid Application Development (RAD) is a software development methodology that has been shown to be more efficient than traditional methods. It prioritizes customer

satisfaction by delivering essential and functional software early in the development process, with a focus on delivering it seamlessly (Chien, 2020). RAD is designed to alleviate the complications that often arise during traditional software development projects, such as lengthy development times, unclear requirements, and limited stakeholder involvement.

The model of this study is depicted in Figure 2, which provides an overview of the research process. The deductive approach used in this study is grounded in the use of a hypothesis that will be tested using empirical data. This methodology requires researchers to start with a theory and then gather data to test its validity. In this case, the study will use the RAD methodology to develop software applications and then test the hypothesis based on the results of the software development process.

Generally, the combination of the deductive methodology and RAD presents an innovative approach to software development research. By using RAD, the study can achieve the objective of delivering functional software that meets customer needs while also gathering empirical data to test the research hypothesis. The resulting data can provide insights into the effectiveness of the RAD methodology and its potential benefits over traditional software development methods.

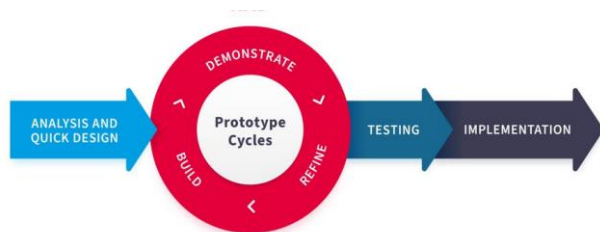


Fig 2. Random Application Development Model

A. Analysis and Design Phase

For this study, the researcher gathered information from a variety of pharmacy stores that were both manually operated and those that used their own Pharmacy Management Information System (PMIS) software. While some pharmacies did implement a PMIS, the functions were often limited to sales and stock inventory management only. In contrast, other PMIS implementations were more complex and included additional features that were not directly related to pharmacy operations.

Through this process, the researcher gained a better understanding of the different types of PMIS currently in use and the extent to which they are utilized in pharmacy operations. This information will be crucial in the analysis of the results and the evaluation of the PMIS software's effectiveness in improving pharmacy operations. Similarly, the researcher also considers the operations research techniques (Mourtada & Ouladsine, 2020) may apply during the development of the system software to give the purpose of effectiveness of the pharmacy operations.

B. User Design

The researcher considered the graphical user interface (GUI) simple as possible and easy to manipulate by the end-user. For example, Figures 2 and 4 below show the system's main command button running after completing the user login screen.



Fig 2. Functional Button



Fig 3. Sub Functional Button

Figures 2 and 3 showcase the functional buttons used to achieve the desired output during the implementation of the systems. Each button corresponds to a specific action that can be taken within the software.

These Figures provide a visual representation of the software's user interface and the various screens that users can interact with. By incorporating functional buttons and a user-friendly design, the software aims to provide a streamlined user experience that will help pharmacy staff complete tasks more efficiently.

In general, the inclusion of these Figures in the study provides a better understanding of the PMIS software's design and functionality, and helps to illustrate how it can be used to improve pharmacy operations.

During the user design phase of the study, the researcher recognized the importance of implementing security measures to ensure the integrity of the system. One of the key security features implemented in the system was a login authentication process, which helps to prevent unauthorized access. In addition, the system was designed to monitor user activity while they are logged in to prevent potential security breaches.

To ensure the software's usability, the system was designed to include several input areas, including:

- Sales module: This module enables users to record and track sales transactions, including the sale of items, payment collection, and change given to the customer.
- Inventory module: This module allows users to manage stock levels, view product details, and receive alerts when items are running low.
- Purchase module: This module facilitates the purchasing process by allowing users to create and submit purchase orders, receive invoices, and track the status of orders.
- Reports module: This module generates detailed reports on sales, inventory, and purchase transactions, providing insights into business performance and identifying areas for improvement.

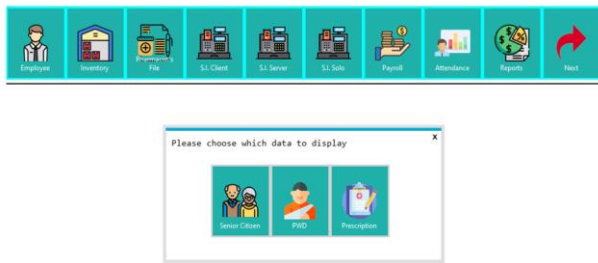


Fig 7. Pharmacy Book Screen

Daily Time Record (DTR)

In addition to the Sales Inventory and prescription tracking functions, the PMIS software also includes a vital feature for managing employee payroll. The daily time record function is essential for keeping track of each employee's attendance and providing an accurate basis for calculating their salary.

Since all aspects of the pharmacy operation are automated, the daily time record function utilizes an RFID reader to scan the employee's RFID tag for attendance tracking. This feature not only ensures accurate attendance records but also streamlines the payroll process, reducing errors and saving time.

Figure 8 illustrates the attendance screen, which provides an easy-to-use interface for employees to clock in and out using their RFID tags. By including this function in the PMIS software, the pharmacy can efficiently manage employee attendance and payroll, reducing the workload and increasing accuracy.

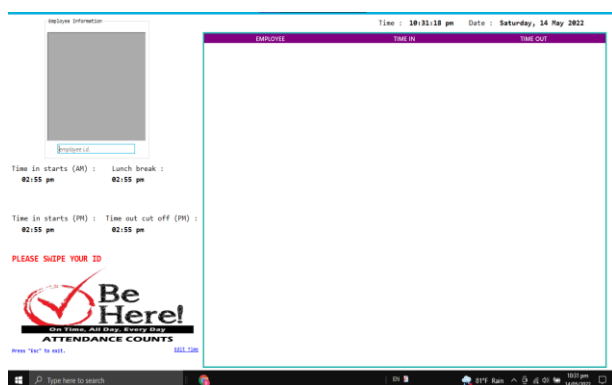


Fig 8. Attendance Screen

C. Rapid Construction Feedback

During the development of the PMIS software, the researcher took into account the importance of operational processing, which involves complex computing and structural interactions of various systems such as inventory of stocks, inventory of sales, payroll, employees, accounting, and financials. These functions play a crucial role in the day-to-day operations of a pharmacy, and the software needs to be designed to handle them efficiently and accurately.

Operations research plays a vital role at this application development stage as it requires a systematic and thorough analysis to complete the entire application successfully. The

researcher considered each of the functions that needed to be implemented in the PMIS software, as outlined below:

- **Inventory of Stocks:** The software should be capable of tracking the inventory of drugs and other products in the pharmacy accurately. This function involves updating stock levels and generating alerts when stock levels are low.
- **Inventory of Sales:** The software should also be capable of tracking the pharmacy's sales accurately, including the amount of money earned from each sale, the date and time of the sale, and the product sold.
- **Payroll:** The software should automate the payroll process by tracking employee attendance and calculating their salary based on their attendance record. This function ensures that employees are paid accurately and on time.
- **Employees:** The software should also have a function for managing employee data, including their personal information, employment details, and attendance records.
- **Accounting and Financials:** The software should be capable of generating financial reports, including profit and loss statements, balance sheets, and other financial metrics that help the pharmacy management make informed decisions.

The researcher considered each of the functions outlined above to ensure that the software was designed to handle them efficiently and accurately. By doing so, the PMIS software provides a comprehensive solution that can help streamline the pharmacy's day-to-day operations and improve its overall efficiency.

Stocks Inventory

Stock items refer to the goods that are sold to customers, and the stocks inventory includes not only the products but also the materials and equipment necessary for the pharmacy operations. It is essential to have a well-maintained inventory to keep track of consumed items and purchased equipment and to identify damaged or expired items. The stock inventory screen, as displayed in Figure 9, contains various functions to facilitate the inventory management process. The color coding in the items reflects the expiration date of the medicine, making it easy to identify the expired and nearly expired items.



Fig 9. Stocks Inventory Screen

Sales Inventory

The daily sales inventory (DSI) is a financial ratio that represents the average time a company takes to make sales of its inventory, including goods in production. To achieve accurate and timely sales inventory reports, the Point of Sale (POS) system is the most effective implementation. The POS system instantly generates precise and up-to-date sales inventory reports, making it the preferred method. Figure 10 below displays the sales invoice after the customer's order has been processed, and it can be viewed in a multi-user environment.

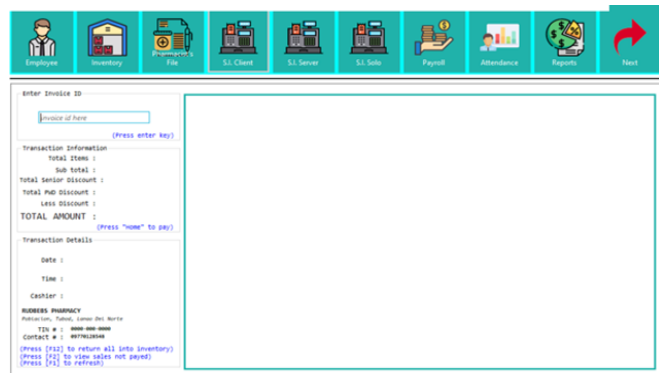


Fig 10. Sales Invoice Screen

Payroll

Payroll is a crucial aspect of any business that requires the employer to compensate employees for their work over a fixed period or on specific dates. Traditionally, this process was managed manually by the human resources or accounting department of a company. However, with the development of technology, automated payroll systems have become more prevalent in the business world. In the case of this study, the payroll system was developed to simplify the work of the human resource department and the pharmacy owner. Figure 11 provides an illustration of the payroll screen in the system, which allows for easy and accurate computation of employee salaries and benefits.

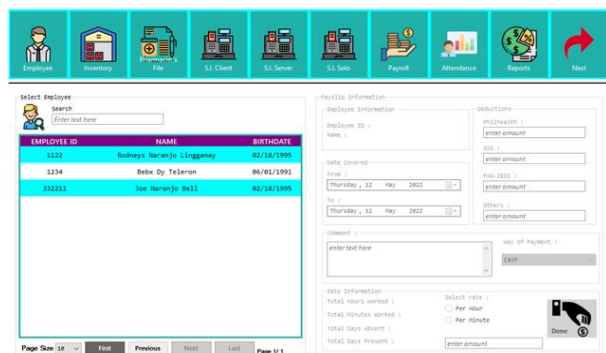


Fig 11. Payroll Screen

Employee

The employee database, also called the company staff database, serves as a digital repository of pertinent employee details such as their name, address, contact information, and start date. In the context of pharmacy operations and PMIS

implementation, the database enables the system to assign user rights. Figure 12 below illustrates the employee database screen of the system.

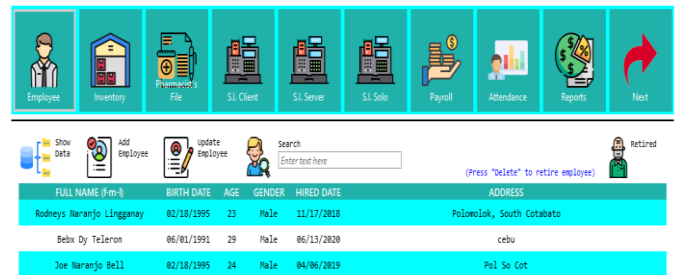


Fig 12. Employees Database Screen

Expenses

The system has the capability to calculate expenses for the financial statement by detecting entries from the expenses form or screen, which may include bills for electricity, rentals, cash advances, and others. Additionally, payables for SSS, PHILHEALTH, and PAG-IBIG can also be encoded into the system. These deductions, along with payroll, are subtracted from the employee's monthly salary, making them classified as payables that the owner must regularly settle with these institutions. Figure 13 illustrates the expenses option button in the system.



Fig 13. Expenses Option Button

Accounting

The accounting process involves reviewing, examining, and reporting financial transactions to regulatory agencies, tax collection entities, and other governing bodies. This includes reporting to agencies such as SSS, PAG-IBIG Fund, Philhealth, and the Bureau of Internal Revenue. The financial report screen, as shown in Figure 14, provides monthly and annual options to generate comprehensive reports for accounting purposes.

system effectively and efficiently, ensuring smooth and seamless operations within the pharmacy.

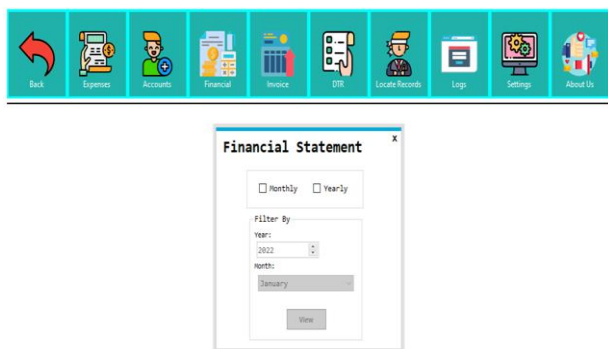


Fig 14. Financial Report Options

Financial Statement

The PMIS system's financial statement reports are a critical component that enables owners, pharmacists, and managers to view and print monthly and yearly financial statements. The date range of information can be selected, allowing them to determine the income status, whether it is LOSS or PROFITABLE. This feature provides an overview of the financial status of the pharmacy. Figure 15 displays the financial report of the PMIS system.

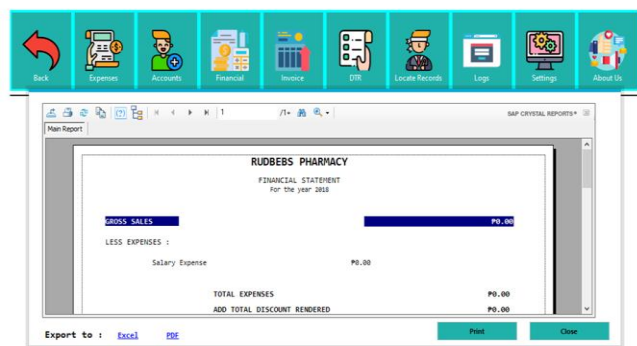


Fig 15. Financial Statement Report

D. Product Implementation

The implementation of the PMIS system was carried out in a newly established pharmacy to evaluate its reliability and functionality. During this phase, the pharmacy assistant was responsible for handling customer transactions using the sales inventory screen, as shown in Figure 16. This screen serves as the point of sale (POS) system, which is an essential component of the pharmacy's operation.

The implementation phase is a critical part of the PMIS system because it is during this phase that all purchases are encoded into the system. This enables the system to generate accurate reports of the entire capital of the business operation. By encoding all purchases, the system can keep track of the pharmacy's inventory and prevent any potential losses that may arise from inefficient inventory management.

Moreover, the implementation phase also allows the pharmacy assistant to become familiar with the system's various features and functions. Through training and orientation, the pharmacy assistant can learn how to use the

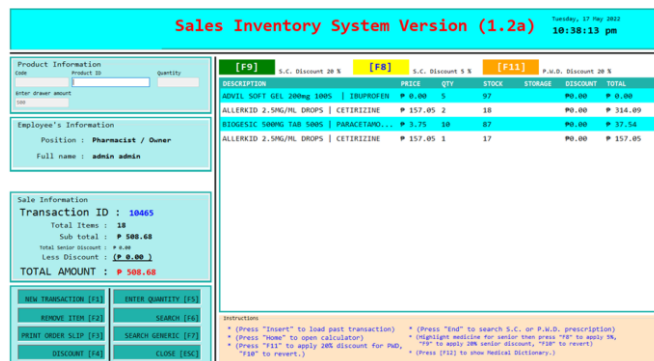


Figure 16. Point of Sale from Sales Inventory

The image in Figure 17 displays the cashier screen of the PMIS system. This screen is used when a customer wants to purchase medicine from the pharmacy. The cashier will select the medicine that the customer wants to buy and record it in the server database by inputting the transaction code. This code is used to trace the current order of the medication, and it is also used to calculate the total cost of the purchased items. The use of this system simplifies the transaction process, reduces human error, and ensures accurate record-keeping of all purchases made in the pharmacy.

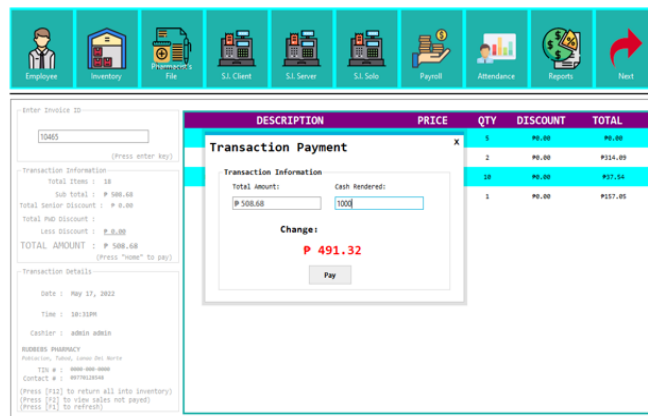


Fig 17. Cashiers Screen

3. RESULTS AND DISCUSSIONS

Based on the operations research conducted on the business process of the pharmacy business operation, the researcher was able to come up with an output that will automate the entire business process, thereby minimizing its complexity. This automation will be made possible through the implementation of a PMIS (Pharmacy Management Information System).

With the PMIS in place, the pharmacy owner can concentrate more on expanding the business branches, as overseeing the business activity will no longer be an issue. Figure 18 illustrates how the PMIS will work in practice. The system will deflect the pharmacy attendant's task of manually searching for medicines in the database. Upon searching for a

“Efficient Management of Pharmacy Operations through Operations Research Techniques”

particular medication, the price, inventory, and storage location of the drug will be displayed on the screen.

Furthermore, the PMIS will also provide various function keys that will be active for transacting customers. These function keys will include customers' discounts, such as Senior Citizen and PWD discounts, as well as variable discount entry for promotional products. Additionally, the system will include a medical dictionary that will be essential in providing details about specific medications. The medical dictionary's records will be pre-loaded into the system since it is not an online platform.



Fig 19. Sales Report Option Button

Sales Inventory System Version (1.2a) Thursday, 07 May 2022 10:52:16 pm

Search Product:

(Use keys up and down to navigate) (Press Enter to select.)

DESCRIPTION	PRICE	STOCK ON HAND	STORAGE
ADVIL SOFT GEL 200mg 10MS TRISUFEN	99.00	182	
ALXAN FR CAP 1000 ISIPROFENPARACETAMOL	99.00	39	
ALDAZIDE 25MG/25MG SPERONOLACTONE HYDROFLUMETHAZIDE	920.11	1	
ALLERKID 2.5MG/ML DROPS CETIRIZINE	9157.85	20	
ALLERKID 5MG/5ML 30ML CETIRIZINE	9143.33	2	
ALLERKID 5MG/5ML 60ML CETIRIZINE	9158.25	10	
ALNIX 5MG/5ML 30ML SYR CETIRIZINE	9147.26	2	
ALNIX PLUS 5MG/5ML 60ML SYR CETIRIZINE-PHENYLEPHRINE	9166.17	7	
ALLERTEA 10MG TAB 50S LORATADINE	923.10	2	
ALTHEA PILLS CYPROTERON ACETATE/ETHINYL ESTADIOL	9433.15	2	
AMPALAYA PLUS 550MG CAP AMPALAYA	97.02	2	
ANGINAK 90 TRIMETAZIDINE 60MG	916.50	2	
ANTIOK 100ML HERBIMAZOLE	9176.82	2	
APPREKID 5MG SYR 120ML B-COMPLEX,IRON,LYSINE	9176.16	2	

* (Press "Insert" to load past transaction) * (Press "End" to search S.C. or P.W.D. prescription)
 * (Press "Home" to open calculator) * (Highlight medicines for senior then press "F10" to apply SR)
 * (Press "F11" to apply 20% discount for PWD, "F12" to apply 10% senior discount, "F13" to revert)
 * (Press "F14" to show available stocks items) * (Press "F15" to show 0 stocks items)
 * (Press "F16" to display corresponding generics.) * (Press "F17" to show Medical Dictionary.)

Fig 18. Point of Sale customer transaction

The implementation of the PMIS in the pharmacy business operation will have a significant impact on the business's efficiency and effectiveness. One of the benefits of the system is the ability to generate reports instantly, which can be viewed and printed by clicking the desired function keys.

For instance, Figure 19 displays the report's function buttons, which will provide the user with various reporting options. These reports will include data on sales, inventory, customer information, and other essential information that will help the pharmacy owner make informed decisions about the business's direction.

The PMIS will allow the pharmacy owner to access real-time data, which will enable them to make accurate and timely decisions. The system's reporting function will also help identify areas that need improvement and areas of success in the business operation.

Finally, the PMIS implementation will provide the pharmacy business operation with a reliable and efficient way to generate reports, which will help the pharmacy owner make informed decisions. The reporting function will provide essential information that will help identify areas of improvement and success, leading to a more effective and profitable business operation.

In generating reports on inventory and customer information, the PMIS system also includes a sales report function that presents the capital and profit of the business operation. Figure 20 displays the daily sales report that presents details of the day's sales, including the total number of sales, the total amount sold, the cost of goods sold, and the gross profit.

Moreover, Figure 21 provides a closer look at the daily sales report and displays more detailed information about the day's sales, such as the item name, the quantity sold, the selling price, the cost price, and the total amount for each item. This level of detail will enable the pharmacy owner to identify which products are selling well and which ones need to be re-evaluated.

The daily sales report will provide the pharmacy owner with essential information that will help them make informed decisions about the business's direction. For instance, the report will provide information on which products are popular with customers, which days of the week have higher sales volumes, and which customers are frequent buyers.

The PMIS system's sales report function will provide the pharmacy business operation with accurate and timely information on the business's sales performance. The report will contain critical data that will enable the pharmacy owner to make informed decisions about the business's direction and identify areas for improvement.

RUCIBES PHARMACY DAILY SALES

SALES ON May 17, 2022

Total quantity sold	38
Total Sales	908.00
Total Cost	6.00
Total Profit	902.00
Grand Cash Amount	908.00

Export to:

Fig 20. Daily Sales Report

“Efficient Management of Pharmacy Operations through Operations Research Techniques”

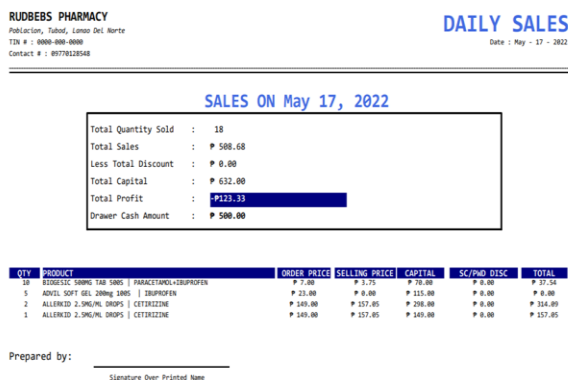


Fig 21. Closer Look of the Daily Sales Report

Data analytics is another valuable feature included in the implementation of the PMIS system. The system will display the top 20 most salable medications, based on the recorded sales data, to provide the pharmacist and pharmacy manager with useful insights into their customers' preferences. This information will enable the pharmacy business operation to order more medicine based on the reported top 20 salable medications, ensuring that the pharmacy is well-stocked with the most in-demand medications.

Figure 22 illustrates the ascending order of the most salable medication, with the top-selling medication at the top of the list. This information will be essential for the pharmacy owner to make informed decisions about which products to order and how much to stock up on. By using data analytics to monitor sales data, the pharmacy business operation can ensure that they are meeting the demands of their customers and maximizing their profits.



Fig 22. Top 20 Salable Medication

4. CONCLUSION

The researcher's findings suggest that implementing an Information System software that caters specific functions only in the pharmacy business operation is not productive and advisable. This is because such a system can create an avenue for employees to cheat and commit fraudulent activities. Instead, the key to becoming productive and efficient in most companies is automation. By automating the entire business process, the system will be less prone to human error and manipulation, ensuring the accuracy and reliability of the data recorded.

Furthermore, implementing the newly developed software by the research called complete Pharmacy Automate system's reporting function will provide the pharmacy owner with a more accessible and more efficient way of generating financial reports. With just a click of a button, the owner can instantly view the business's total expenditure, profit, payables, and receivables. This feature will save the pharmacy owner time and effort in generating reports, enabling them to focus on other critical aspects of the business operation.

Additionally, the Pharmacy Automate system's data analytics feature will allow the pharmacy owner to view the salable medicines' analytics in a second, providing a reliable basis for ordering new medication. This information will enable the pharmacy owner to make informed decisions about the business's direction, ensuring that they are meeting their customers' demands and maximizing their profits.

Also, the researcher highlights the importance of operations research in making complex business decisions and achieving business success. By using a scientific approach to decision-making, the pharmacy owner can ensure that they are making informed decisions based on reliable data and analysis, rather than on intuition or guesswork.

Finally, the implementation of a Pharmacy Automate system that automates reporting, and data analytics features can provide significant benefits to the pharmacy business operation. By ensuring accuracy, reliability, and efficiency in the business process, the pharmacy owner can make informed decisions based on reliable data, achieving long-term success in the business.

3. 5. RECOMMENDATION

The researcher recommends implementing the Pharmacy Automate system at the opening of the pharmacy business. By doing so, the pharmacy manager and attendant can be familiar with the system's functions and features, allowing them to use it more efficiently. Additionally, implementing the system at the beginning will enable the pharmacy owner to track any discrepancies in the financial management of the business.

The Pharmacy Automate system will provide real-time tracking and monitoring of all transactions and activities within the business, making it easier to trace any discrepancies or irregularities in the financial management. This feature will ensure that the business's finances are properly managed, minimizing the risk of fraud or errors in financial reporting. Moreover, the system's tracking and monitoring features will enable the pharmacy owner to have greater control over the business's operations, making it easier to manage the business effectively.

6. ACKNOWLEDGMENTS

The author would like to acknowledge the support of our Lord Jesus Christ, who is the source of wisdom and strength. The author believe that His protection and guidance have been vital in making sound judgments and decisions in the course of conducting this study. The authors' faith has been a driving

force in their pursuit of knowledge and their desire to contribute to the betterment of society.

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