

OPTIMIZING PHARMACY MANAGEMENT INFORMATION SYSTEMS THROUGH OPERATIONS RESEARCH DESIGN AND IMPLEMENTATION

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Abstract

This study explores how Pharmacy Management Information Systems (PMIS) might be optimised by using the design and implementation of operations research (OR). It looks at how OR approaches can improve PMIS's overall performance, efficacy, and efficiency in pharmacy settings. Pharmacy systems can improve patient care outcomes, expedite inventory management, and improve medicine dispensing operations by utilising OR approaches including mathematical modelling, simulation, and optimisation algorithms. The abstract emphasises how crucial it is to incorporate OR principles into PMIS design and deployment in order to handle difficult operational problems and promote ongoing pharmacy service improvement. By using this strategy, pharmacists may improve patient pleasure, accuracy, and cost-effectiveness—all of which will raise the standard of healthcare delivery.

Keywords: *Optimizing, Pharmacy Management Information Systems Operations Research Design Implementation, accounting, Inventory Management, Operations Research.*

1. INTRODUCTION

Global industry and government have witnessed a radical transformation in the collection, preservation, and utilization of information in recent times. The paper-based, error-prone, and delayed workplace of the past has given way to an information technology (IT)-based one. Even though IT has the potential to significantly increase accuracy and timeliness, it cannot resolve the serious issues with administrative inertia or staff capability on its own. In this fast-paced era, information technology is ingrained in all fields. IT is the process of converting, storing, protecting, processing, transmitting, and obtaining information safely utilizing electronic computers and computer software.

The real world is taken into consideration when developing the clinical pharmaceutical management system. The prescription for the patient review in the general operations department is used as an illustration by the chemists. Before and after utilizing the clinical

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February 2024

pharmacy management system, the productivity of clinical pharmacists was evaluated, as well as the quality and qualifying rates of prescription medications.

The Australian Department of Veterans Affairs (DVA) now uses the pharmacy management information systems (PMIS) software. It focuses on the information management design and the goals of the drug management programme.

When the pharmacy owner implemented the PMIS in their business, the researcher collected all the requirements that were needed for its creation. Additionally, the operations research of both large and small pharmacies may demonstrate a successful implementation and track all drug inventories coming into and going out of the pharmacy, as well as the cash flows of the entire international pharmacy business. The operations research conceptual framework for the pharmaceutical industry is depicted in Figure 1 below.

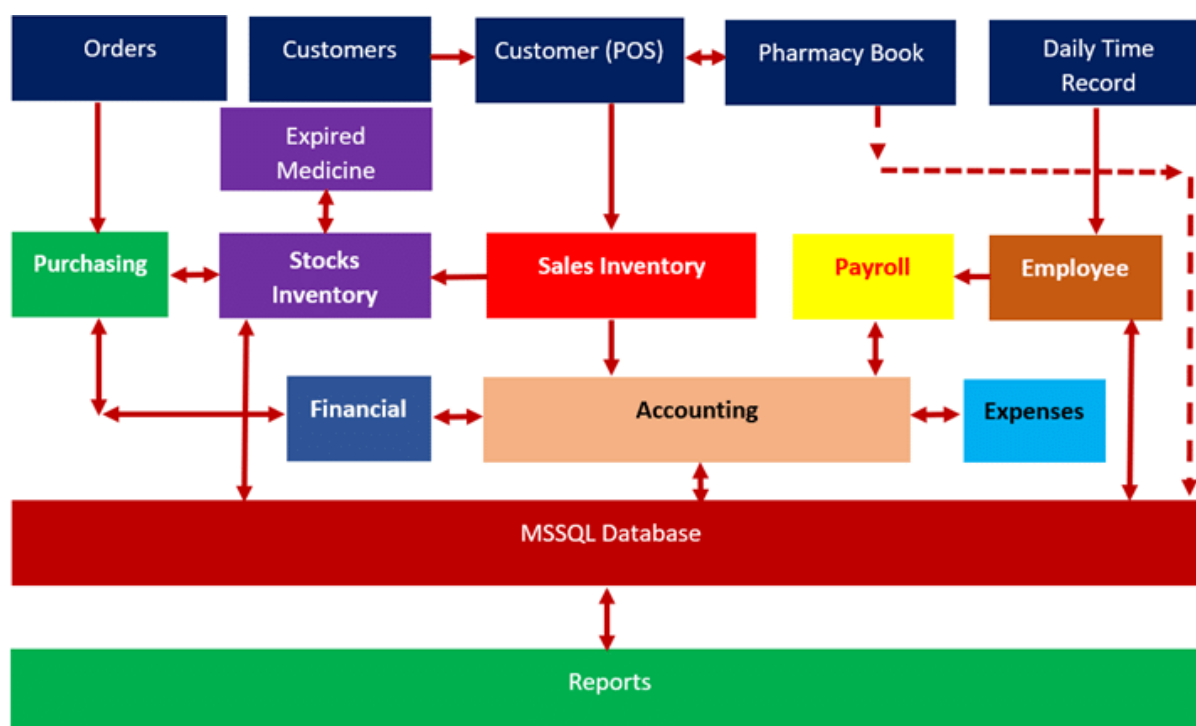


Figure 1:Operations Research Framework

1.1. Objective Of the Study

The main goal of this study is to provide guidance to aspiring pharmacy owners so they can use the PMIS of the industry rather than managing it manually. Its specific goal is to develop and carry out operations research on computerized pharmaceutical management information systems with a front-end based on Visual Basic.net and a back-end based on an MSSQL database server.

Exploring Innovation Research Methodologies in a Variety of Multidisciplinary Fields and Their Prospective Future Impact

February 2024

1. Create procedures for tracking orders, clients, sales, inventories, payroll, employee time sheets, drug expiration, bookkeeping, outlays, accounting, and finance.
2. Create a Windows-based application that covers every facet of pharmacy business procedures using Visual Basic.net and MSSQL.
3. Put the system into practice in a pharmacy to evaluate the PMIS's integrity and efficacy in practical operations.

2. LITERATURE REVIEW

Guha and Kumar (2018) examine the development of big data research in the fields of information systems, operations management, and healthcare, offering an overview of previous contributions and a research plan for the future.

Malik, Abdallah, and Ala'raj (2018) do a thorough analysis of the literature on the applications of data mining and predictive analytics in the provision of healthcare services, providing insightful information on the use of advanced analytics to enhance patient outcomes.

Sazvar, Zokaee, Tavakkoli-Moghaddam, Salari, and Nayeri (2021) concentrate on creating a long-lasting closed-loop pharmaceutical supply chain in markets with intense competition, taking into account elements like waste management, manufacturer's brand, and unpredictable demand.

3. METHODOLOGY

Due to its experimental design, which relies on Random Application Development, the study's methodology is deductive. By focusing on client satisfaction through the timely and seamless delivery of necessary, functioning software, rapid application development reduces problems compared to traditional software development approaches. The study's model is shown in Figure 2.

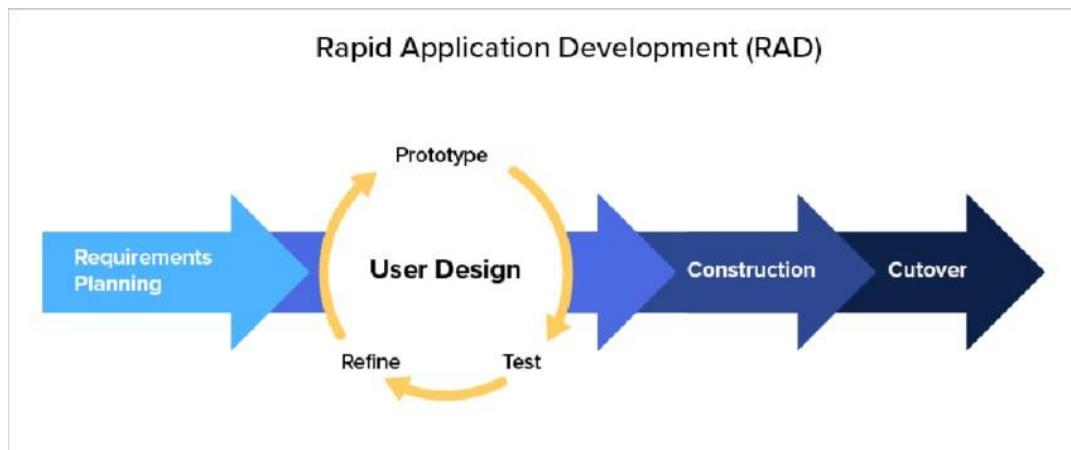


Figure 2:Model of Random Application Development

A. Project Requirements

- Some pharmacies use PMIS, however it only has features for stock inventory and sales. Others are more intricate, encompassing aspects that bear little connection to the basic functions associated with pharmacies.
- Front-End. Productive, multifunctional, type-safe, object-oriented, and open-source is Visual Basic.net.
- Back-end. An MSSQL database server powers the system's back end, acting as the system's central repository for all transaction data.
- Operating Systems. For the implementation, Windows 10 is advised because it is simple to set up in a network or multi-user environment.
- Hardware. As for the system's hardware specifications, the MSSQL database server's central storage should have at least an Intel i3 or higher processor, 8GB of RAM, 512GB of solid-state drive space for primary storage, and 1TB or more of secondary storage.
- Network. Every computer connected to the system requires an Ethernet card. Additionally, wireless connectivity can be connected.

B. User Design

The researcher thought that the graphical user interface (GUI) should be as straightforward and user-friendly as possible. Figures 3 and 4 below, for instance, depict

Exploring Innovation Research Methodologies in a Variety of Multidisciplinary Fields and Their Prospective Future Impact

February 2024

the system's primary command button operating following the completion of the user login page.



Figure 3: Functional Button



Figure 4: Sub Functional Button

The buttons in Figures 3 and 4 operate in accordance with the intended output when the systems are implemented.

4. RESULTS AND DISCUSSION

After conducting operations research on the business process of the pharmacy company operation, the researcher ultimately produced the intended outcome. Because they will automate the entire process, the complexity of the business process will be reduced. If the PMIS is installed properly, managing the business activity won't be a problem for the pharmacy owner, allowing them to focus more on growing their branches. The pharmacy clerk serving clients looking to search for medication in the database was diverted in Figure 5 below. Here, the cost of the medication, together with its inventory and storage location, may be seen on the screen when you search for it. For transactional clients, a number of function keys are operational, such as the customer discounts for PWDs, Senior Citizens, and variable discount entries for promotional products. Additionally, a medical lexicon plays a crucial role in enabling the attendant to reply to specifics regarding the medicine in question. Because this is not an internet platform, the medical dictionary's records are pre-loaded.

Exploring Innovation Research Methodologies in a Variety of Multidisciplinary Fields and Their Prospective Future Impact

February 2024



Figure 5: Point of Sale customer transaction

In order to enable the pharmacist and pharmacy manager to purchase additional medication based on the reported top 20 saleable pharmaceuticals, data analytics is also incorporated in the implementation. It will show the top 20 most marketable medications.

5. CONCLUSION

The study came to the conclusion that it is not wise or beneficial to install PMIS software in the pharmacy business operation that handles all transactions since it provides an opportunity for staff fraud. For most businesses, automation is the key to becoming profitable and operating continuously. Additionally, it demonstrates how simple reporting is, particularly for the owner's financial records, as they can view the business's entire expenses, profit, payables, and receivables instantaneously. Furthermore, the system may instantly evaluate the analytics of marketable drugs to inform the purchase of new ones. Finally, it is evident from operations research that a scientific methodology forms the cornerstone of sophisticated decision-making and corporate performance.

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Exploring Innovation Research Methodologies in a Variety of
Multidisciplinary Fields and Their Prospective Future Impact
February 2024

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