

**National College of Ireland**

**Project Submission Sheet**

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| **Date:** | 20 / 04 / 2025 |

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# AI Acknowledgement Supplement

Business Intelligence & CRM Integration for PTU Pharmacy

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| --- | --- | --- |
| **Your Name/Student Number** | **Course** | **Date** |
| Utkarsh Satpute  Tushar Gharpure  Pintoo Baghel | MSc. Data Analytics MSc. Data Analytics MSc. Data Analytics | 20 / 04 / 2025  20/ 04 / 2025  20/ 04 / 2025 |

This section is a supplement to the main assignment, to be used if AI was used in any capacity in the creation of your assignment; if you have queries about how to do this, please contact your lecturer. For an example of how to fill these sections out, please click [here.](https://libguides.ncirl.ie/useofaiinteachingandlearning/studentguide)

**AI Acknowledgement**

This section acknowledges the AI tools that were utilized in the process of completing this assignment.

|  |  |  |
| --- | --- | --- |
| **Tool Name** | **Brief Description** | **Link to tool** |
| **NA** | NA | NA |

**Description of AI Usage**

This section provides a more detailed description of how the AI tools were used in the assignment. It includes information about the prompts given to the AI tool, the responses received, and how these responses were utilized or modified in the assignment. **One table should be used for each tool used**.

|  |  |
| --- | --- |
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**Business Intelligence & CRM Integration for PTU Pharmacy**

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Specification Report

**Abstract:**

This project introduces a complete Business Intelligence (BI) and Customer Relationship Management (CRM) solution designed and developed for PTU Pharmacy, a hospital-based pharmacy facing struggling with declining sales, limited and weak customer engagement, inefficient supplier coordination, and lack of data visibility and transparency. The goal was to transform PTU into a data-driven organization capable of competing with external players like Best Pharma. To achieve this, we created mock datasets simulating real-world problems/challenges and implemented interactive Power BI dashboards and customized Salesforce CRM modules. The dashboards helped to identify key issues such as high pricing, limited operating hours, stock shortages, absence of loyalty programs, and low conversion rate of hospital visitors into pharmacy sales. The CRM system was implemented to focus on structured customer management, enhance supplier coordination, track orders efficiently, and enable loyalty engagement. The project outcomes revealed valuable business insights, addressed key operational gaps, and established foundation for predictive inventory planning, competitive pricing strategies, and future automation initiatives. This report outlines the complete journey from project specification to system implementation, highlighting the role of BI and CRM technologies contributed in improving pharmacy performance and informed decision-making.

**Keywords:** Business Intelligence (BI), Customer Relationship Management (CRM), Power BI, Salesforce, Pharmacy Management, Data-Driven Decision Making, Dashboard Reporting, Inventory Optimization, Customer Loyalty, Healthcare Analytics.

**Section 1: Background Information & Background Goals:**

This project is based on the hospital in-house Pharmacy to You store that operates within a healthcare facility. This pharmacy was initially established to provide essential medicines and healthcare related products to patients, hospital staff and visitors. Being located within the hospital premises it was expected to give a competitive advantage in terms of accessibility and immediate availability of medicines. However, over the years, the pharmacy encountered several operational challenges that have directly impacted its growth, sales and customer retention.

The pharmacy operates into a highly competitive market where customers have various options such as nearby retail pharmacies, online medicines delivery pharmacy and a chain pharmacy outlet. Upon conducting the research, it was found out that the external competitors offer extended working hours (opening hours), discounts to their customers, and delivery services which are currently missing for our pharmacy. Due to these factors, the patients tend to purchase medicines from external stores or online platforms rather than purchasing from in-house pharmacy.

To overcome these challenges and to enhance the performance of pharmacy, the primary goal of this project is to increase its customer engagement, boost sales and to establish a steady streamline operational efficiency. As per the previous research, Business intelligence (BI) plays a crucial role in improving healthcare operations and enhancing decision (Future Computing and Informatics Journal, 2024). We aim to implement advanced Business intelligence (BI) tools and Customer Relationships Management (CRM) systems to achieve a competitive edge in the market. Along with this we will set up dashboards for real-time reporting, predictive inventory management to avoid stock-outs and loyalty programs to retain existing customers. Additionally, the pharmacy will look up to improve its connections with patients through automated reminders, promotional campaigns and adding personalized services.

The Pharmacy to you (PTU) which is the in-house pharmacy is currently facing strong competition in the market, particularly because of its nearby pharmacy that is Best Pharma. It is a leading competitor for us, and it known for its cost-efficient medicines and their services. This competition has created significant pressure for the PTU which lacks features and not using advanced systems.

An exploratory data analysis (EDA) conducted through Power BI dashboard revelled that several critical insights. PTU pharmacy sales are lower as compared to its rival Best Pharma. It is facing frequent stock-outs and suffering from poorly managed inventory which are the main cause of sales affecting. And as compared to the Best Pharma they give better customer engagements, and they provide better product availability. It was also observed that PTU sales drop during evening hours due to limited working times.

To overcome this problem a detailed GAP analysis was performed, referring to the current situation of PTU pharmacy and desired future sales. The sales highlighted that the pharmacy currently lack Customer Relationship Management Systems, as it relied on the traditional method that is using manual processes, faced stock out problems, it also had low customer engagement and poor supplier management. To improve its conditions, we will integrate Salesforce CRM for customer management, Power BI dashboards for real time insights, predictive inventory management, introduce loyalty programme and improving the supplier tracking performance monitoring.

Furthermore, a SWOT (Strengths, Weakness, Opportunities, Threats) analysis was conducted to evaluate the pharmacy’s internal strengths and weaknesses along with the external opportunities and threats. From analysis the key strengths of the PTU were the strategic location as it located inside the hospital it is direct access to the patients and hospital staff.

A hallway with a sign on the wall

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**Figure 1: PTU Pharmacy’s in hospital location**

The weakness include that it lacked the CRM, loyalty programs, limited operational hours and poor inventory managements. It had great opportunity to implement BI and CRM solutions. However, the treats are from external competitors like the best pharma and other online pharmacies. We have also created an original image for our Swot analysis.

A diagram of a swot analysis

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**Figure 2: SWOT ANALYSIS “Illustrated original”**

**Section 2: System Design**

To overcome the current challenges faced by PTU and to improve its efficiency, a well structed system designed has been proposed. This system design integrated Business Intelligence (BI) tools and Customer Relationships Management (CRM) system to ensure that the pharmacy can manage its daily operation more effectively, handle customer engagement better and make data driven decision in real-time.

This system design mainly focuses on several areas such as sales tracking, inventory management, supplier performance monitoring, customer handling, loyalty management and reporting. This system will help in PTU pharmacy in transforming into a more customer-centric, data-driven organization. Which is shown in the Figure 1.

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**Fig 3: PTU Pharmacy Project vision, business goal and expected outcomes.**

**“Illustrate Original”**

* Data Capture

Data plays a important role in designing the BI and CRM solution for PTU pharmacy. The system captures different type of data from various daily operational activities of the pharmacy, which helps for better decision-making and smooth functioning.

The sales data capture essential details like the product name, quality sold, sales data and total amount of each transaction. Inventory data records the stock level, availability of products, stock out and reorder levels which ensure product are always available for customers.

Supplier data is captured to track supplier names, delivery timelines, order details and their overall performance. Customer data is also collected, including patient details, their purchase history which helps in providing personalized services.

Additionally, with the help of CRM implementation which includes customer queries, support tickets, loyalty points earned. All these data points together will help PTU pharmacy to build a strong and organized database.

A diagram of a data storage

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**Fig 4: Data Flow Diagram Showcasing Data Capture and movement into BI & CRM System “Illustrated Original”.**

* Reporting Requirements

The main purpose of implementing analytics in PTU pharmacy is to understand the business performance and to make better decisions. By using the data collected from sales, inventory, suppliers and customers, the pharmacy can easily track how their business is working.

The sales analysis focuses on tracking sales over different period such as daily, weekly and monthly trends to understand customer buying behaviour. This will help to understand which day sales are good and bad. Inventory monitor and sales forecasting will help the pharmacy to avoid storage of medicine.

Supplier performance will track the list of suppliers for delivering on timely products. Customer analysis will help to understand customer preferences, frequently purchased products and loyalty program participation.

The pharmacy will also be able to track customer complaints and support tickets to provide quick solutions and improve customer satisfaction. The dashboard created will display all the information in an easy-to-understand format. According to the research Bi dashboards and KPIs help to track the sales performance, supplier efficiency and overall inventory control in pharmacy businesses (Advances in intelligent systems and Computing, 2020).

* Role of CRM in PTU

The implementation of Salesforce CRM plays a crucial role in the overall system designing of PTU pharmacy. CRM helps in maintaining and maintaining customer relationships effectively. It supports the creation and management of detailed customer profiles, including their personal information and purchase history. CRM enables to manage loyalty programs and reward points encouraging customers to return for report purchases.

CRM also helps in tracking customer complaints and support tickets which are timely resolved which improve customer service. The CRM system also supports automated reminders for medicine refills and promote campaign management through email.

The implementation of CRM will help PTU in improving customer satisfaction, increasing customer retention and maintaining customer relationships (Journal of Economics, Management and Trade, 2023)

* Dashboard design:

Dashboards are essential component of Bi solution for PTU pharmacy. These dashboards will provide real time insights and detailed reporting of PTU. As we know image speaks louder then than the words, the dashboard are designed to visualize important data which enable the management to track key performance indicators of PTU.

Dashboard to be designed includes:

1. The PTU vs Best Pharma dashboard supplier performance comparison dashboard. This dashboard is designed to provide a comparative analysis between PTU and its competitor Best Pharma. In this we have specifically focused in the supplier performances, which will be helpful for the PTU to understand which supplier availability, which product are most frequently supplied and highlights any supplier related gaps or delays as compared to best pharma.
2. The Best Pharma sales performance dashboard helps in understanding and analysing the sales pattern, top selling products and customer preferences Which contribute most to their sales. These insights will allow PTU to plan competitive strategies and improve their own products offerings.
3. The PTU sales performance dashboard is focused on its internal sales performance. It will help in tracking daily, weekly and monthly sales trends, customer engagements levels, products wise sales and it will identify the most and least selling products. It will also support in taking better decision for sales growth.
4. The PTU hospital Management Dashboard provides a complete operation of the PTU pharmacy overall performance. It combines data from sales, inventory, supplier and customer handling in a single view. It will allow management to monitor stock levels, track supplier activities and check customer queries.

**Section 3: Database Design**

To support the operation of PTU pharmacy’s BI and CRM system, we have developed a proper database design. The main purpose of this design is to store all the operational data in a structed and organized manner. This database helps in capturing the required data related to sales tractions, inventory management, suppliers, customer details and CRM activities.

This well-organized storage of data will help PTU pharmacy to easily generate reports, monitor the stock levels, analysis the customer behaviour and to handle supplier management. This design also ensures that all data correctly for daily operations into Power-Bi dashboards and salesforce.

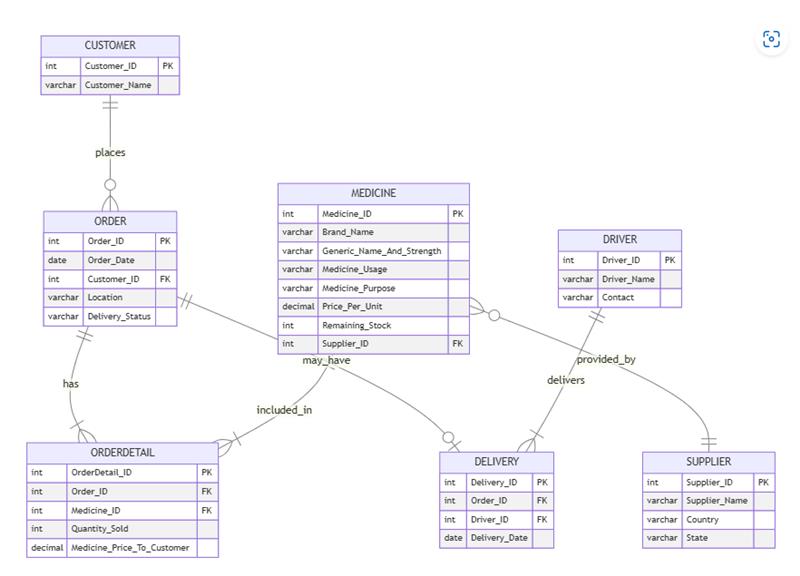
* ER Diagram Explanation:

The Entity Relationship Diagram (ERD) of the PTU pharmacy shows the relationship between all the important entities involving in the system. The ERD has been designed based on the various operational activities of the PTU.

The ERD contains five main activities:

1. Sales: This table captures all the sales transactions.
2. Inventory: This table maintains details of all products and their available stock.
3. Supplier: This table records all the supplier details and their activities.
4. Customer: This table contains all customer information.
5. CRM interaction: This table records all customer queries, complaints, support tickets, and loyalty programs.

Each entity is connected based on the relationship between them. For example, the sales table is linked with the customer table and inventory table through customer and product IDs. Similarly, supplier information is linked with inventory details for product sourcing.

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**Fig 5: ER Diagram of PTU Pharmacy Database**

* Data Dictionary of PTU Pharmacy:

Data dictionary provides a clear and structured overview of the database design by explaining the tables used, their fields and data types. In the project it helps us to understand how data is organized and managed within the system.

In the PTU pharmacy project, the data dictionary helps us in understanding how the data is organized and managed within the system.

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**Figure 6: Data Dictionary**

**Section 4: Mock Data & Data Structures**

For the implementation of Power BI and CRM solution for PTU Pharmacy, a proper fully functional dataset is required for the analysis and for reporting. As real operational data was not available with could aligning with the problem statement that requires implementations of CRM solutions. So, we used Kaggle datasets for inspiration and reference in order to generate a fully functional dataset for our project. Mocked data is generated from Mockaroo (<https://mockaroo.com/>).

The original dataset consisted of daily transactions of pharmacy sales data and original medicine dataset of medicine providing the detailed information of medicine names, compositions, usage, manufactures, and pricing. Although pricing we made it very different. To generate real world scenarios without taking sensitive information, we created two competitive datasets for two pharmacies i.e. Best\_Pharma and PTU.

These datasets are generated by using the mockaroo an online platform to generate mock datasets. The daily sales contains like Date, Day, Opening Hours, Brand Name, Generic Name, Usage, Price, Discount, Customer, Units Sold, Remaining Stock, Final Price, Taxes, and Location, while the *Combined Medicine Dataset* contained Medicine Name, Generic Composition, Usage, Manufacturer, Price, and Stock. The mocked datasets have same structure but with some additional information to suit the business scenarios such as both pharmacy names and randomized customer names for privacy, locations and financial data like price, discount, and taxes. We have added brand name which is very useful while generating report and visualizations.

For the sales data, we have created supplier dataset for both pharmacy and it’s a crucial to give view of complete pharmacy operations used for analysis of supply medicine to pharmacy. The original dataset for this purpose was the *Pharma Dataset* that we have taken from Kaggle, which is having detailed information about suppliers, medicines, their usage, generic composition, pricing, stock levels, and locations. Two separate datasets of suppliers are created for both pharmacies. The original *Pharma Dataset* contained attributes like Date, Season, Brand Name, Generic Composition, Medicine Usage, Purpose, Supplier Name, Country, State, and Stock Quantity and the mocked dataset is having some kind of same attributes with additional information of supplier brand names, location for both pharmacies. Additional financial information such as stocks, supplier details are also added, and this will allow accurate analysis of sales and inventory of both pharmacies.

At last, in addition to for the sales, inventory and supplier we have added two more datasets which are created by using mockaroo. The first dataset is about the driver information which are available near PTU. This dataset contains driver name, availability status, location coordinates, contact number and distance from PTU. The second and last mocked dataset is hospital visit to show that the low rate means patients are coming in hospital but not turning into customer for PTU pharmacy. This includes patient names, reason to visit, hospital location, doctor name and consultation details. Both datasets are created to generate a real-world scenario for the PTU pharmacy reporting and visualizations after which we’ll be applying CRM based solutions to increase sales and growth of pharmacy.

**Section 5: Conclusion**

In this report we have presented a complete behaviour solution for the Pharmacy TO You (PTU) with the help of BI and CRM system. The report highlights the existing operational challenges faced by pharmacy such as poor management, lack of customer engagement.

To overcome these challenges, well developed a well-structured system design which focused on real -time data analysis with the help of Power-BI dashboards and CRM. The dataset we design with an appropriate Entity Relationship Diagram (ERD) and data dictionary to support and store and manage critical operations data.

We also took help to create a data with mockaroo for creating a real-life scenario for PTU. The mock datasets were created for sales, inventory, suppliers, customer management, driver availability and hospital visits. This was used for making in the dashboard which provide a meaningful business insight.

Overall, this report presents a complete solution for PTU pharmacy that can help improve the operational efficiency, increase customer engagement, handle supplier management effectively and support long term business growth.

Implementation Report

**Section 1: Development Process**

The development process of the PTU pharmacy Business intelligence (BI) and Customer Relationship Management (CRM) solution started with the identifying the key business problems they faced in daily operations. As they were facing several challenges like the poor inventory management, lack of customer engagement, weak supplier handling and increasing competitions form its competitor Best Pharma. The primary goal of this project was to design a system that could improve customer engagement, boost sales and streamline operational efficiency using BI dashboard and CRM tools.

In the initial phase the project involved understanding the existing business process and planning solution. In the beginning, the focus was only on handling sales data, inventory details, supplier information and customer records for analysis using Power BI dashboards. However, during the project progression, it was identified that PTU was not only lacking in the operational factor, but it also lacked the customer interaction data and a proper CRM system for customer handling and loyalty management. To address this gap, we decided to implemented Salesforce CRM in the project to manage the customer data more effectively.

Since real pharmacy data was unavailable for the project, mock dataset was generated using Mockaroo. The dataset was created including the sales data, Inventory Data, supplier data, Customer data, and CRM interaction data. To create a real-world business scenario, we generated two extra datasets one was Driver Availability dataset for handling delivery operations, and another was Hospital Visit Dataset to understand the gap between hospital patients and actual PTU pharmacy customers.

The dataset design was prepared using Entity Relationship Diagram (ERD) to show the relationship between all the major table such as Sales, Inventory, Supplier, Customer and CRM interactions. We also performed data preprocessing was done to clean and format the data properly by removing duplicates, handle missing values and aligned the data as per reporting and CRM requirements.

The final architecture involved a dual platform solution like using Power BI for visual analytics and Salesforce CRM for customer engagement. Cleaned data was loaded into these platforms following ERD schema.

Power BI dashboards visualized the sales trends, supplier performances, stock level and customer purchase through interactive dashboard. In the dashboard we used the bar charts, pie charts, KPI’s and line charts. To make customer relation better we implemented CRM. In that we handle Customers, Order, Supplier, Medicines and CRM queries. We also added loyalty points to encourage customer retention and handle the complaints and tickets.

We also added Process Control Features such as field validations, record types and lookup relationship in the CRM to ensure clean and consistent data management. As project evolved we also added driver management and hospital visit to track.

**Section 2: CRM Implementation**

The implementation of Sales force CRM for PTU Pharmacy was a crucial step in managing daily operation. The goal of CRM was to make a streamline the handling for Customers, Orders, Suppliers, Medicines and Drivers, while also enabling data validation, reporting and real-time visualization through dashboard and reports.

1. Managing Medicine Inventory and Suppliers

To manage the medicine inventory and supplier records, Medicine object was created in Salesforce CRM. It captured details like Medicine Name, Generic Composition, Usage, Manufacture and the Price. This helped PTU to store details of medicine related data. Which we can see in the image of Medicine CRM. Which we can see in the Figure 7: Medicine CRM Details.

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**Figure 7: Medicine Details CRM**

To map each medicine to its respective supplier we used Lookup Relationship between the Medicine and Supplier objects. This helped PTU to track the supplier which provide each medicines. In the supplier object the key details include like the Supplier Name, Location and its Supplier Contact Information for the effective supplier management. We have also provided its screenshot for the Supplier object. Which we can see in the figure 8: Supplier detail CRM.

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**Figure 8: Supplier Details CRM**

1. Handling Orders and Sales Process

To manage order transaction, we created a Order object in the Salesforce. It includes all the necessary fields like the Order Name, Order Data, Customer Name, when was the Medical Purchased, Total Price and the Unit Sold. This allowed PTU to track all sales and maintain customer purchase history which we can see in the Figure 9: Order object deatils

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**Figure 8: Order Object Details CRM**

Additionally, we also linked Order with the Customer and Medicine Objects to provide Complete transaction visibility. This helped for tracking the sales and customer specific purchase history analysis. As you can see int the PTU Order Report. We can refer to the Figure 9.

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**Figure 9: PTU Order Report.**

1. Capturing Customer Details & Loyalty Points

For managing customer profiles, we created a customer object which includes customer specific fields like Customer Name, Email, Phone Number, Loyalty Points and Address. We also applied rule like a validation for the emails and phone numbers to enter the data correctly. This helped PTU in customer engagement.

1. Reporting

We also created a SalesForce report to analyze sales-based medicine sold, customer transactions and total sales revenue. The PTU orders report displayed sales records grouped by medicine name and also enhanced with the bar charts. Further, to summarize all report for PTU we created a dashboard which contains a complete overview of the sales pattern, top-selling medicines and customer behaviour trends. We can see in the figure 10: PTU Order Report & Dashboard

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**Figure 10: PTU Order Report & Dashboard**

1. Managing Data Upload & Validation

All the records for Customer, Orders, Medicines, Supplier and Driver were uploaded using Data Import Wizard. Key Validation Rules and Access Controls were applied. For example:

* Suppliers’ information could only be modified by Admin.
* Mandatory fields like Order Price, Medicine Name, and Customer Details were enforced with non-null checks.
* SOQL query was used to validate on the uploaded data.

1. Final Impact of CRM Implementation

By implementing CRM it improved inventory tracking, supplier relationship management and customer engagement. The system aso support accurate data validation, real time reporting and lays the groundwork for future scalability, such as automated reminders or loyalty program triggers.

**Section 3: Dashboards and Reports Implementation**

To uncover the critical business issues and operational improvement, we have developed Power BI dashboards which analyze the pharmacy’s performance and compared it with the competitor, Best Pharma. With the help of dashboards, we addressed key insights like the pricing differences, customer engagement issues, supplier inefficiency, seasonal stock shortage and conversion from hospital visits to the pharmacy. Each dashboard was designed using tailored mock datasets and presented insights through interactive charts, KPIs and filters.

1. PTU SALES DASHBOARD

The PTU sales dashboard focused on the internal performances of the pharmacy. We have visualized product-wise sales, pricing patterns, and sales distribution over the working hours. The data revelled that PTU had higher rates compared to its competitor. The dashboard showed minimal or no discounts for the regular customers. Another problem we addressed was the drop of sales in the evening, which highlighted the impact of PTU shorter working hours till 7pm. Because of early closing time it was an advantage point for the Best Pharma extending its sales. Lastly, the seasonal sales visual showed frequent stock-out of the High demand medicines like the flu and allergy treatments, which pointed to the lack of predictive stock planning

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**Fig 11: PTU Sales Dashboard**

1. BEST PHARMA DASHBOARD:

The second dashboard is a of its competitor performance. It shows that the Best Pharma maintain its competitive medicine pricing with including the structured discounts and loyalty points for the returning customers. These strategies contribute to their higher sales and stronger the customer retention. The dashboard also demonstrated that Best Pharma maintains it product availability during seasonal spikes and also they attract their repeated customers with the pricing incentives.

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**Fig 12: BEST PHARMA DASHBOARD**

1. Supplier Dashboard comparing vendor performance and delivery service of PTU and Best Pharma:

The supplier comparison dashboard focused on the procurement side of the pharmacies. It highlights that the PTU pharmacy relies on less number of suppliers who deliver less efficient and which leads to less number of brands availability of brands in PTU. While on other hand, for the Best Pharma it operates with larger supplier but reliable vendors. The dashboard we compared supplier delivery timelines, order volumes and cost impact which suggested that PTU could be benefited from renegotiating supplier contracts or consolidating vendors to improve the speed and stock consistency. Also, with service level data showed that PTU does not offer home delivery, while on another side Best Pharma includes home delivery services, improve accessibility for remote or elder customers.

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**Figure 13: Supplier comparison between PTU & Best Pharma**

1. Hospital Dashboard

This dashboard explores the relationship between hospital visits of patients and the pharmacy conversions into customers. Even though ENT and Cardiology departments have lots of patients visiting evert day, but very few end up buying medicine from the PTU pharmacy and the dashboard shows this gap clearly.

All four dashboards are interactive filters such as data range, departments and product category were used to enable drill down analysis. These dashboards not only visualized the eight identified problems but also provided a decision support tool for PTU pharmacy to improve its business efficiency.

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**Figure 14: Hospital Dashboard**

**Section 4: Response to the Solution**

The main objective of our project was to find out and address the critical gaps in our PTU pharmacy that includes high pricing, poor customer retention, insufficient supply, stock issues and low conversion rates from hospital to PTU customers. These were the main reason for decline in sales and performance of PTU pharmacy and growth of the pharmacy.

After Application of Business Intelligence (BI) tools and implementation of Salesforce(CRM) our PTU pharmacy gained much visibility and control over to its operations. The dashboards provide real-time insights into pricing gaps, stock shortages, delivery timelines, and sales trends. With the help of this dashboard pharmacy management can compare the prices of medicines, track the supplier’s details and can approach the loyalty programs for daily or frequent customers.

After this analysis, we found out some several key business gaps were addressed

* pricing comparison helped initiate a revised medicine price rates to match the competitions and market expectations.
* Some of major drawback that is stock shortage during the seasonal demand period were identified early that helps PTU to adopt more predictive adaptation of stocks.
* Supplier comparison can help PTU to identify major cheap supplier for same kind of medicine use for bulk orders. Supplier comparison data revealed the inefficiencies of PTU’s current vendors, enabling negotiations to reduce delivery times and consolidate procurement channels.
* The identification of no discounts and no loyalty bonus or rewards tends to low show rate of customer in pharmacy, while planning customer engagement strategies like bonus points and repeat-buyer offers will show increase in customer retention.

On the Customer Relationship Management side, structured customer data and automated complaint handling allowed PTU to begin managing its service interactions more efficiently. Although not fully rolled out yet, the system supports future implementation of email reminders, loyalty tracking, and targeted communication.

The hospital dashboard revealed that very large number unlike about 70% are not PTU customers, they refer to take medicines from outside the pharmacy. These insights are critical to proposal of in-hospital awareness campaigns and bundled offers for patients, improving the potential for in-house customer conversion. While solutions are in implementation stages where BI and CRM are about to close many business gaps in PTU which will lead the organization to be improved in operations, gain more customers and data-driven decision-making across the organization.

**Section 5: Reflection and Future Improvements**

This project has offered insightful learning experience in both technical and business aspects. Utilizing with Power BI and Salesforce CRM enabled us to understand how real-time analytics and organized data management can significantly improve business performance in the pharmacy industry.

A major challenge we faced was designing realistic datasets that accurately simulated actual business issues. Creating data to represent pricing gaps, stock shortages, supplier inefficiencies, and patient conversion issues required detailed planning and thoughtful scenario building. Additionally, ensuring and maintaining consistency between Power BI and Salesforce for consistent analysis was also technically challenging and complex.

Another challenge we faced was simplifying complex data into a clear way that was simple but still meaningful. Designing and developing clear, interactive dashboards that effectively highlighted the business issues required several design iterations and continuous feedback sessions. Also, getting comfortable and familiar with Salesforce’s data structure, validation rules, and custom objects took time.

Looking back, better initial planning of dataset structure to minimize rework during the dashboard development and CRM integration stages. Dedicated more time allocating to cleaning and normalizing data before importing into Salesforce would have improved and enhanced the overall flow and efficiency.

**Future Improvements:**

We aim too:

* Implementing automated email notification and loyalty point tracker.
* Introducing an online ordering system with integrating with driver data.
* Exploring sentiment analysis of customer feedback.
* Leveraging Al tools to assess customer satisfaction and behaviour pattern.

Overall, this project demonstrated how effectively collected and visualized data can transform the way a business uncovers problems and makes informed decisions. The experience deepened our understanding of both data analytics tools and the real-world application of business intelligence in practical situations.

**Section 6: Team Management**

The project titled “Business Intelligence and CRM Integration for PTU Pharmacy” was successfully executed by a collaborative team of three members: Utkarsh Satpute (x23135760), who led the report structuring, content integration, data preparation; Tushar Gharpure (x23289902), who managed the design and development of the Power BI dashboards; and Pintoo Baghel (x23287501), who focused on Salesforce CRM implementation and related visual workflows.

The team employed collaborative tools such as Trello for task tracking, Miro for brainstorming and flow design. Each member contributed to their assigned domain while maintaining transparency and communication throughout the project timeline.

Below are the links used to project management and team collaboration:

Trello Board – Task tracking and Individual Contributions

<https://trello.com/invite/b/67d9c07ea14e349e7120df95/ATTI54fd50572ac999eaa998e86700650544D011C5E6/ptu-in-house-pharmacy-bi-ba-project>

Miro Board – Dashboard Planning and CRM Architecture

<https://miro.com/app/board/uXjVIWNeoZk=/?share_link_id=222356666989>

**Section 7 References:**

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[**https://journaljemt.com/index.php/JEMT/article/view/1258**](https://journaljemt.com/index.php/JEMT/article/view/1258)