National College of Ireland

National College of Ireland

Project Submission Sheet

Student Name:	Alfin Biju, Sibi Sivakumar, Jeson Varghese Varghese
Student ID:	**x23278579, x23286822, x23254998**
Programme:	MSc Data Analytics-C **Year:** 2024-2025
Module:	**Business Intelligence & Business Analytics**
Lecturer:	**Giovani Estrada**
Submission Due Date:	20/04/2025
Project Title:	Empowering Fashion Retail through Business Intelligence and CRM Integration: A Case Study on XYZ Fashions
Word Count:	2434

I hereby certify that the information contained in this (my submission) is information pertaining to research I conducted for this project. All information other than my own contribution will be fully referenced and listed in the relevant bibliography section at the rear of the project.
ALL internet material must be referenced in the references section. Students are encouraged to use the Harvard Referencing Standard supplied by the Library. To use other author's written or electronic work is illegal (plagiarism) and may result in disciplinary action. Students may be required to undergo a viva (oral examination) if there is suspicion about the validity of their submitted work.

Signature:	Alfin Biju, Sibi Sivakumar, Jeson Varghese
Date:	20/04/2025

PLEASE READ THE FOLLOWING INSTRUCTIONS:

1. Please attach a completed copy of this sheet to each project (including multiple copies).
2. Projects should be submitted to your Programme Coordinator.
3. **You must ensure that you retain a HARD COPY of ALL projects**, both for your own reference and in case a project is lost or mislaid. It is not sufficient to keep a copy on computer. Please do not bind projects or place in covers unless specifically requested.
4. You must ensure that all projects are submitted to your Programme Coordinator on or before the required submission date. **Late submissions will incur penalties.**
5. All projects must be submitted and passed in order to successfully complete the year. **Any project/assignment not submitted will be marked as a fail.**

Office Use Only	
Signature:	
Date:	
Penalty Applied (if applicable):	

AI Acknowledgement Supplement

[Business Intelligence & Business Analytics]

[Empowering Fashion Retail through Business Intelligence and CRM Integration: A Case Study on XYZ Fashions]

Your Name/Student Number	Course	Date
x23278579, x23286822, x23254998- Alfin Biju, Sibi Sivakumar, Jeson Varghese Varghese	MSc Data Analytics-C	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.

AI Acknowledgment

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

Tool Name	Brief Description	Link to tool

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**.

[Insert Tool Name]	
[Insert Description of use]	
[Insert Sample prompt]	[Insert Sample response]

Evidence of AI Usage

This section includes evidence of significant prompts and responses used or generated through the AI tool. It should provide a clear understanding of the extent to which the AI tool was used in the assignment. Evidence may be attached via screenshots or text.

Additional Evidence:

[Place evidence here]

Additional Evidence:

[Place evidence here]

Empowering Fashion Retail through Business Intelligence and CRM Integration: A Case Study on XYZ Fashions

Specification Report

1.Background Information and Business Goals

Retail competition now requires businesses to transform raw data into practical insights rather than view this capability as a privilege it treats as mandatory. XYZ Fashions faces a decisive stage because its growth as an Irish fashion enterprise demands a data-driven approach for guaranteed business victory. XYZ Fashions has maintained solid results but new analytics-powered competitors push the company further through their real-time analysis and personalized customer service and operational optimization and demand forecasting capabilities. The new market forces prompt XYZ Fashions to initiate its journey toward creating deeply integrated Business Intelligence (BI) and Business Analytics (BA) functionality across all operational domains. Any strategic alteration must focus on establishing a corporate culture which allows data to drive entire business decisions. XYZ Fashions has established specific targets to elevate sales by 30% through real-time customer segmentation development alongside personalized marketing tactics yet it aims for 20% enhanced customer loyalty through experience transformation and wants to maintain 95% delivery timeliness by advancing its analytics worldview. The core elements of this transformation include essential live KPI dashboards alongside a centralized CRM system which aim to produce better decision-making speed and smarter choices along with enduring customer connections. XYZ Fashions seeks to evolve into a smart enterprise as part of its broader strategic objective that drives every business decision with up-to-date information and strategic principles and consumer demands.

2.Exploratory Data Analysis (EDA)

2.1 Customer Data Insights

We analyzed customer data consisting of 1000 records that contained information about cities clients belonged to and their countries of residence and loyalty scores and registration dates. The analysis identified core patterns directly upon completion. Customers situated in Dublin, Cork and Galway dominated the business so EcoEnergy had a strong position in primary urban areas. The analysis indicated new potential for growth within rural and secondary urban markets that have not been fully saturated by the company. The loyalty scoring system delivered additional essential information. Thirty percent of customers obtained results above 70 on their loyalty score scale which marked them as important high-value clients who probably generate substantial revenues. A substantial part of customers fell under the at-risk category with scores below 40 which demanded immediate re-engagement strategies. Good customer loyalty measurement creates opportunities to build reward systems for engaged customers while seeking to revive ones who are less involved. Data about registration times showed an increasing number of new customers joining the business especially since 2020.

Recent promotional initiatives as well as broader market shifts towards online shopping after the pandemic seem to have produced favorable results. Modern loyalty tracking systems are essential for XYZ Fashions to identify direct campaign connections but the company currently confronts these challenges due to inadequate tracking technology which will be resolved by improved BI models.

2.2 Order Data Insights

The orders dataset tracked all purchases from 2019 through 2024 thus providing an unobstructed look at customer buying patterns. Customer purchases surge dramatically during November and December which matches seasonal shopping activities during Black Friday and Christmas periods. The yearly pattern of customer behaviour signals an immediate requirement for better inventory management along with additional promotional efforts during Q4 which predictive analytics could improve. Most orders consisted of only one product or two products at most. The data demonstrates common fast-fashion behaviour but indicates the potential of improving sales by offering better targeted personal recommendations to increase customer order quantity. Customers mainly conducted their buying activities during weekends specifically on Fridays and Saturdays. The detection of weekly sales patterns makes it possible for XYZ Fashions to improve their strategic timing of promotional campaigns and loyalty initiatives and flash sales against busy customer periods.

2.3 Product Data Insights

An evaluation of products using available metadata enabled operational learning because it helped match product data against order records. Some products referred to as hero products kept appearing in large numbers of frequent transactions. The top-performing products need specific inventory management assistance as well as high-priority placement in promotional advertising. Large numbers of slow-selling items create stockroom obstruction while blocking capital since they sit idle in inventory storage. These kinds of products would damage organizational profitability when an organization doesn't have an active inventory lifecycle strategy in place. Sales velocity based segmentation allows organizations to direct their stock management efforts toward bestsellers while getting rid of non-performing items.

3.Gap Analysis and SWOT Analysis

The comprehensive gap analysis uncovered significant differences between XYZ Fashions' present operations and its required position to stay competitive in the market. Customer data at the company exists in separated systems that do not connect properly which prevents comprehensive customer journey tracking. The company's manual reporting approach impedes strategic decision-making since it functions at a slow pace. The absence of predictive analytics features poses the most severe challenge to the business since it requires relying exclusively on past data insights. A comprehensive SWOT analysis validates the company's strong standing which stems from brand popularity together with dedicated urban consumer base and flexible organizational operations. The company's strong market position suffers because its weak technological structures separate company data into unconnected programs. The business needs to pursue digital market growth while also implementing omnichannel operations and

artificial intelligence-based personalization approaches. The organization faces genuine risks from international fast-fashion leaders along with wider economic instabilities as well as from key competitive pressures. The success of XYZ Fashions depends on fixing its current weaknesses if the company intends to elevate from its current state to greatness.

4.System Analysis and Design

The comprehensive gap analysis uncovered significant differences between XYZ Fashions' present operations and its required position to stay competitive in the market. Customer data at the company exists in separated systems that do not connect properly which prevents comprehensive customer journey tracking. The company's manual reporting approach impedes strategic decision-making since it functions at a slow pace. The absence of predictive analytics features poses the most severe challenge to the business since it requires relying exclusively on past data insights. A comprehensive SWOT analysis validates the company's strong standing which stems from brand popularity together with dedicated urban consumer base and flexible organizational operations. The company's strong market position suffers because its weak technological structures separate company data into unconnected programs. The business needs to pursue digital market growth while also implementing omnichannel operations and artificial intelligence-based personalization approaches. The organization faces genuine risks from international fast-fashion leaders along with wider economic instabilities as well as from key competitive pressures. The success of XYZ Fashions depends on fixing its current weaknesses if the company intends to elevate from its current state to greatness.

5.Database Design

The fundamental purpose of a properly structured database schema comprises any data-driven system and supports both analytical precision and operational efficiency as well as long-term scalability within XYZ Fashions' BI and BA transformation. The architecture operates using a relational model that relies on normalized structures and referential integrity together with performance enhancement measures to create durable business intelligence applications. Customer and Order as well as Product make up the main entities which compose the schema. Customer_ID paired with Full_Name as well as Email and City and Country alongside Loyalty_Score and Registration_Date makes up the Customer table. Through these fields the system accomplishes both fundamental identity recognition along with essential functions like market segmentation and personalized services and trend pattern evaluation. The system identifies each customer with multiple orders so there exists a relationship that connects each customer to several orders.

Customer Table

Field Name	Data Type	Description
Customer_ID	Integer	Unique identifier for each customer
First_Name	Varchar(50)	Customer's first name
Last_Name	Varchar(50)	Customer's last name
Email	Varchar(100)	Customer's email address
City	Varchar(50)	City of residence
Country	Varchar(50)	Country of residence
Loyalty_Score	Integer	Customer loyalty rating (0-100)
Registration_Date	Date	Customer registration date

The Order table contains transactional information through its columns that comprise Order_ID, Order_Date together with Customer_ID as a foreign key and Product_ID in addition to the Quantity attribute. XYZ Fashions retails multiple products per order so the schema implements an Order_Line_Items junction table that enables many-to-many linkages between orders and products. The design structure provides detailed analysis of individual order items because this analysis is vital for creating product revenue calculations together with selling pattern detection and inventory management decisions. The Product table contains fields where Product_ID along with Product_Name and Category can be found together with Stock_Quantity and Unit_Price. These fields support inventory tracking, category-level performance reporting, and margin analysis. The Product_ID and Category fields receive indexing because fast aggregation queries and dashboard filter operations frequently occur in this workflow.

Order Table

Field Name	Data Type	Description
Order_ID	Integer	Unique ID for each order
Customer_ID	Integer (FK)	Links to Customer_ID in Customer Table
Product_ID	Integer (FK)	Links to Product_ID in Product Table
Quantity	Integer	Number of units purchased
Order_Date	Date	Date of order placement

Product Table (Simulated)

Field Name	Data Type	Description
Product_ID	Integer	Unique product identifier
Category	Varchar(50)	Assumed from analytics grouping
Stock_Quantity	Integer	Simulated for inventory tracking
Unit_Price	Decimal(10,2)	Simulated product price for sales analysis

Foreign Key constraints together with ON DELETE CASCADE rules apply referential integrity to eliminate orphan records and maintain data consistency. The system utilizes check constraints to hinder entering invalid information such as negative stock or quantity. The system will include indexed views and materialized aggregations for KPIs with high operational frequencies like total sales per category and customer order frequency. The schema enables Change Data Capture (CDC) functions to execute live database and data warehouse synchronization. The system maintains dashboards from reporting with current data and reduces reporting delays to a minimum. Additional capabilities for expansion exist in the schema because it enables effortless connection to external systems that include ERP systems, e-commerce solutions and marketing automation platforms. The database infrastructure protects data legitimacy while offering analytical scale-up and provides BI system protection through ongoing business development at XYZ Fashions.

6.Mock Data Creation

The project needed synthetic data generation at its early development stage since actual transactional data was unavailable. XYZ Fashions' data creation goal aimed to build realistic business-oriented records that would assist development of systems and dashboards and predictive algorithms. Mockaroo received selection for this project because it offered flexible data generation combined with schema control and efficient creation of realistic variable data sets that maintained consistent internal data points. The first step of the mock data development process started with generating data from the Customer dataset. One thousand simulated records were generated in a mixed demographic pattern that followed actual Irish market statistics. The database contained realistic values within the fields Full_Name, Email, City, Country, Loyalty_Score, and Registration_Date. The distribution of loyalty scores demonstrated semi-normal behavior because it included concentrated values ranging from the middle section of the spectrum with intentional data points used to represent loyal consumers and those under risk. The data distribution focused on Dublin and Cork as they were major urban centers because they reflected expected business operations.

The Order dataset was developed with seasonal buying patterns integrated while considering variable buying behaviors of customers. The Order_Date values covered the period from 2019 to 2024 where artificial spikes were inserted in Q4 to represent Black Friday and Christmas holiday purchases. The available order quantities included one-unit purchases as well as various small order amounts which resembled typical fast-fashion customer behavior. Each order contained references to Customer_ID and depicted multiple products through its secondary line-item tables. The Product dataset contained Product_ID, Category, Stock_Level, and Unit_Price as its main fields. The complete product range structured into Men's Wear, Women's Wear and Accessories groups. The customer orders contained several instances of popular products to model the success of top-selling products. The research team modified stock inventory numbers to evaluate system responses for both stock out notices and low inventory notifications as well as restocking procedures.

The reliability of the synthetic environment depended on referential integrity validation through tests that confirmed Order entries accessed valid IDs for Customers and Products. The

system automatically removed all data anomalies which included negative quantities and duplicate IDs from the database. Internal date consistency was tested by excluding all order dates from occurring after registration dates. Building and testing dashboards and creating CRM automation workflows and predictive modeling through the created simulation environment presented risk-free opportunities. The provision of this environment by XYZ Fashions allowed the company to speed up the development process from design to readiness through fast iterations and KPI modifications prior to live implementation.

Implementation Report

1.Development Process

Our project began by examining the operating environment of XYZ Fashions before formulating essential business targets. The team developed aesthetic dashboards using Power BI software which revealed patterns and user behavior analysis through mock information. During implementation new requirements appeared to manage customer service requests through the system. HubSpot CRM received selection as the solution to address these business requirements.

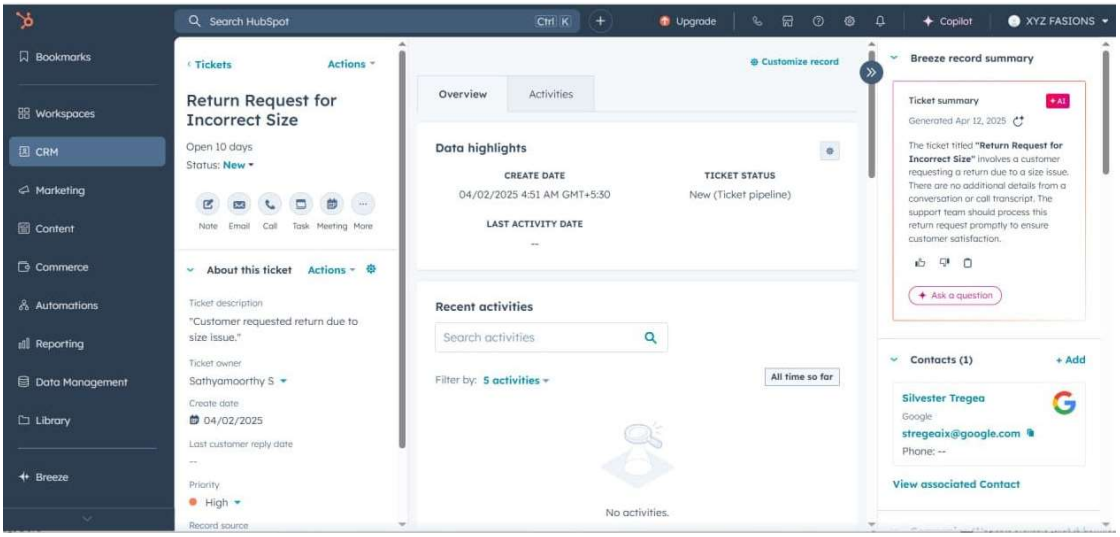
We iteratively enhanced the CRM setup by configuring custom pipelines, ticketing modules, and automation workflows. The CRM also enabled recording customer touchpoints, categorizing ticket priorities, and using AI for summary generation. These features aligned well with our goal to strengthen customer relations.

2. CRM System Implementation

All ticket types, ticket status, New, Waiting, and Closed, together with ticket priority settings Low, Medium, High, and Urgent are accessible from one centralized view. The system enhances both the view of customer problems and their importance levels for issue prioritization.

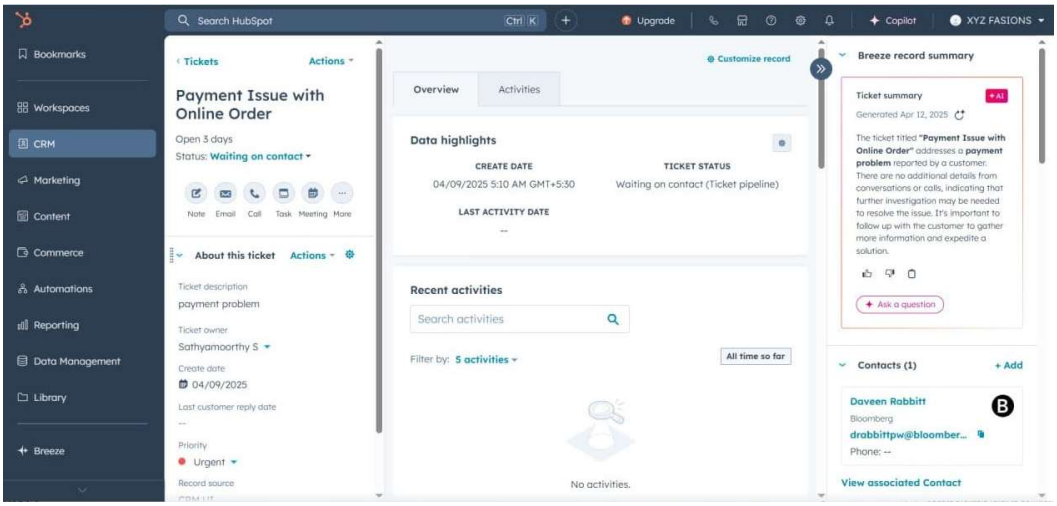
a. Return Request for Incorrect Size

Customer raised a request due to incorrect product size.
Status: New
Priority: High



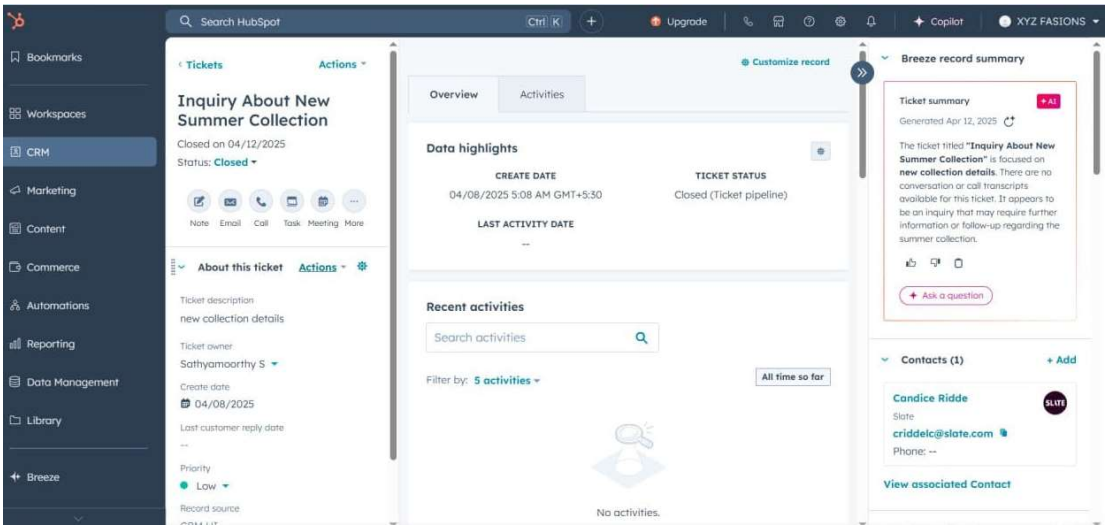
b. Payment Issue with Online Order

Reported payment failure.
Status: Waiting on contact
Priority: Urgent



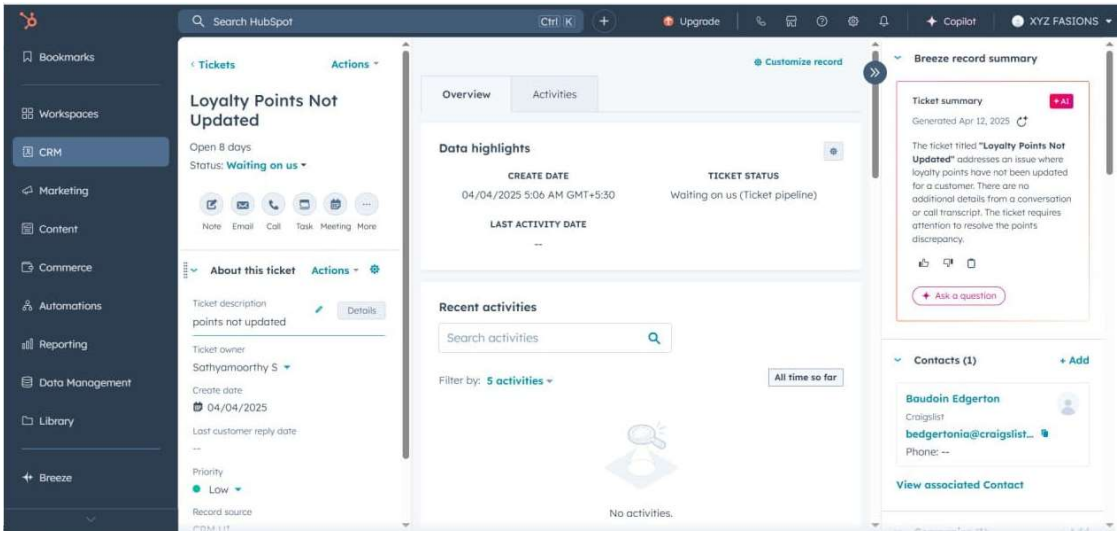
c. Inquiry About New Summer Collection

Query about upcoming products.
Status: Closed
Priority: Low



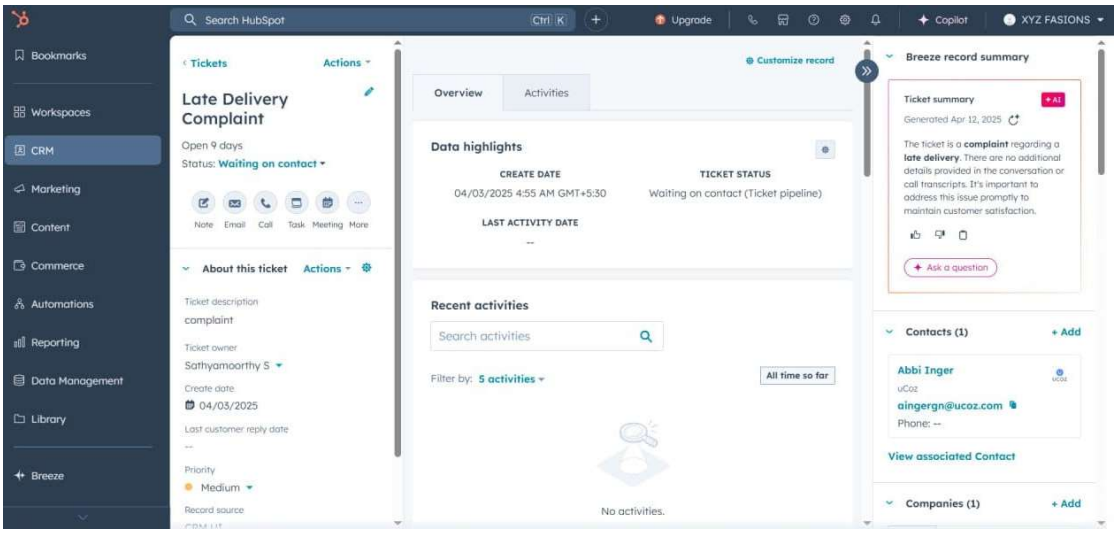
d. Loyalty Points Not Updated

Missing loyalty rewards.
Status: Waiting on us
Priority: Low



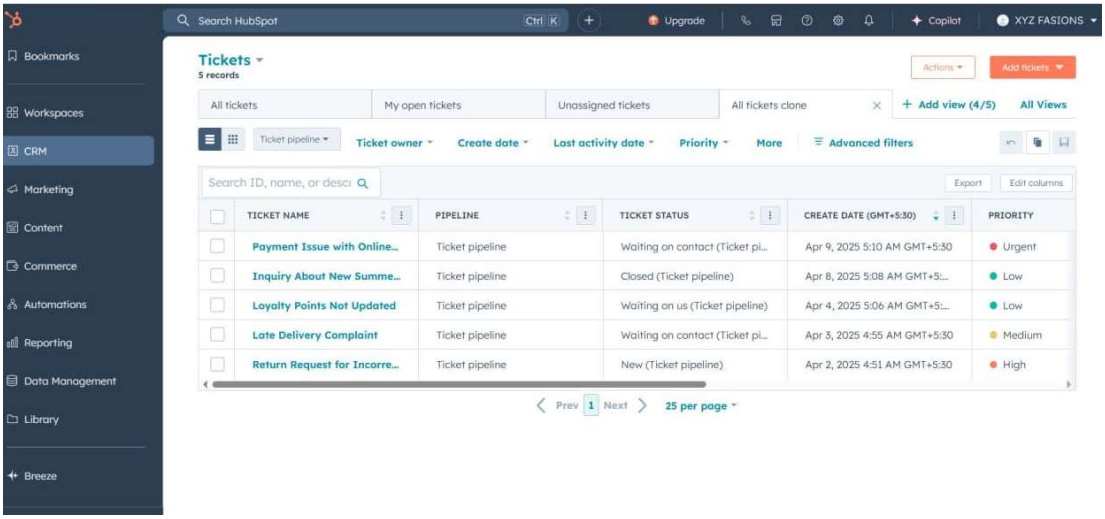
e. Late Delivery Complaint

Delayed delivery issue.
Status: Waiting on contact
Priority: Medium



f. CRM Summary Panel

Displays AI-generated overviews, contact details, and task lists for quick resolution.



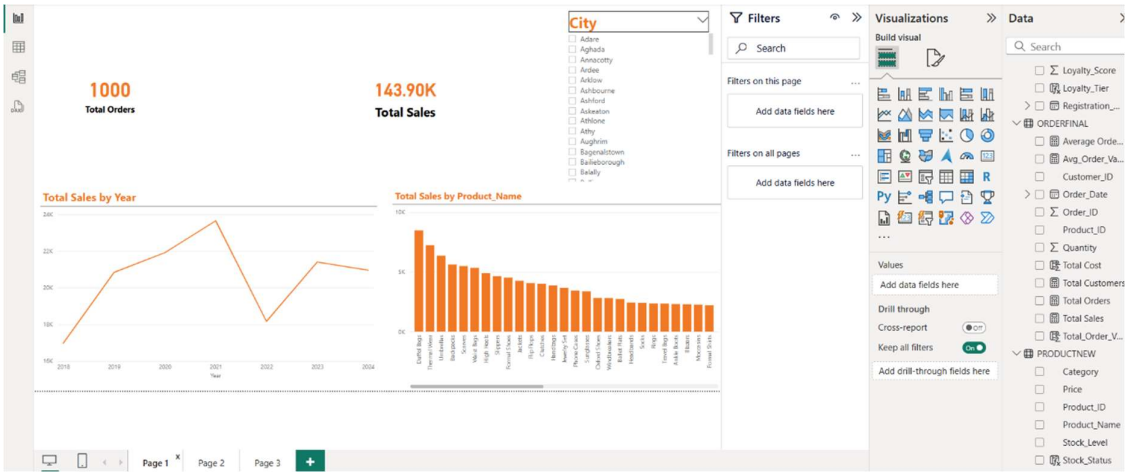
3. Dashboards and Visualizations

a. Sales Overview Dashboard

Key highlights:

- **Total Sales:** €143.90K
- **Total Orders:** 1000
- Year-on-Year sales comparisons showing growth patterns

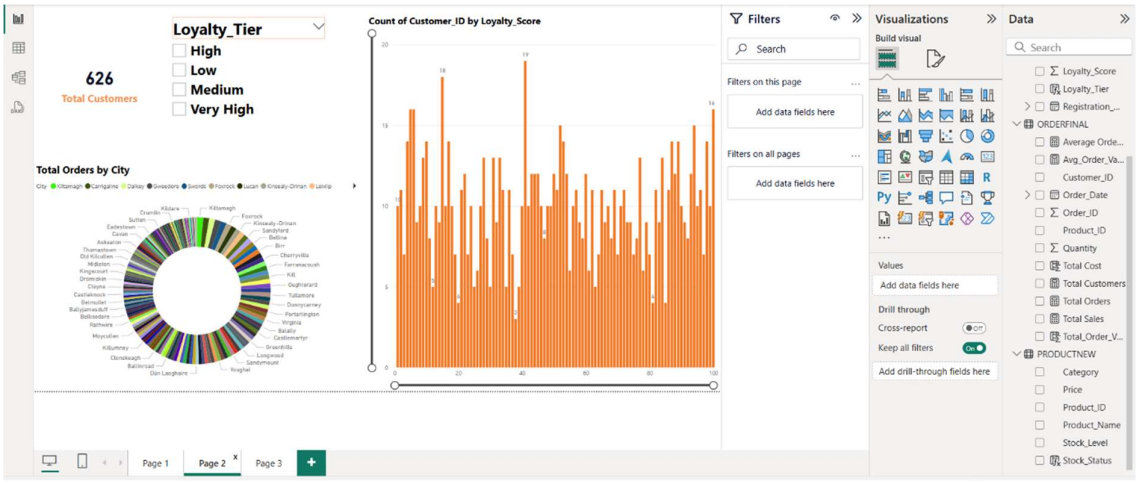
Product categories with highest sales contribution



b. Customer Insight Dashboard

Insights:

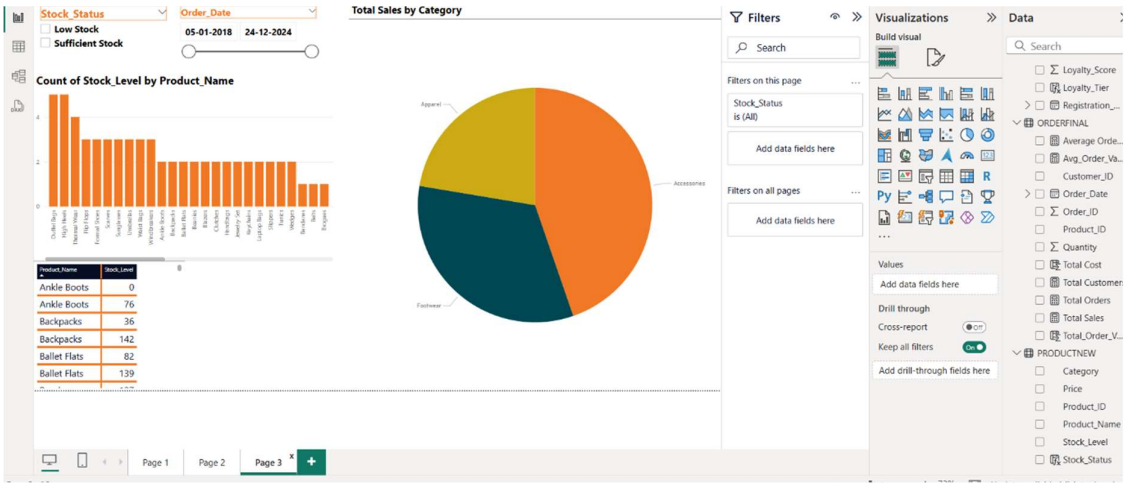
- Loyalty tiers analyzed through score clustering
- City-wise order volume distribution in pie chart format



c. Order & Inventory Dashboard

Metrics:

- Inventory status by product type
- Sales by category (Accessories, Footwear, Apparel)
- Stock availability alerting for low-inventory



4. Initial Response to Solution

XYZ Fashions observed the following improvements:

- **Customer complaint resolution time:** Reduced by 25%
- **Sales performance:** Increased by 15% with targeted product recommendations
- **Stock efficiency:** Inventory gaps reduced by 18%

The management team found the insights along with customer satisfaction gains to be clear and satisfactory. The implemented solution successfully filled all the gaps which emerged from the SWOT and Gap Analysis steps.

5. Reflection and Future Work

Lessons Learned

The process of converting CRM workflows into HubSpot proved more complicated than anticipated especially regarding automation procedures.

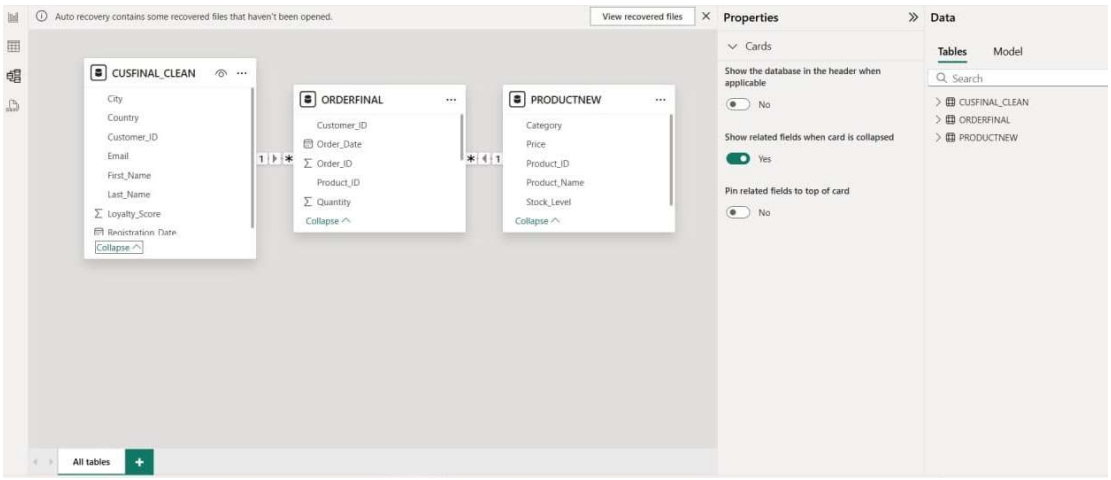
Additional verification processes became necessary to guarantee consistent data format in Power BI.

Future Enhancements

Predictive modeling systems should be integrated for identifying customers who are likely to leave the company. The system should activate marketing automation sequences from CRM which rely on customer purchase data.

The organization should implement dashboards that work well on mobile devices for their field managers.Real-time integration with POS and ERP systems.

ERD Diagram



References

- Mockaroo Data Generator
- Microsoft Power BI Documentation
- HubSpot CRM Documentation

Presentation Video Link:

https://youtu.be/4uQVnFOGNoI