



E- Shop Inc. Specification

Business Intelligence and
Business Analytics CA2

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1. Abstract

This project aims to boost the operational efficiency and customer experience at E-Shop Inc. (fictitious shop), a thriving online retailer that specializes in a wide range of gift items. E-Shop Inc. operates in a highly competitive e-marketplace and offers products like home décor, fashion accessories, personalized gifts, toys, and seasonal items. The project involves a thorough analysis of E-Shop Inc.'s business processes, covering customer acquisition, product management, order processing, customer service, data management, and post-purchase engagement.

The project will provide actionable insights into sales trends, customer behaviour, and inventory management using advanced data analytics and business intelligence tools. E-Shop Inc. can make informed decisions by analysing customer data to enhance marketing strategies, streamline operations, and improve overall customer satisfaction. Power BI visualizations will be developed to highlight key metrics such as monthly sales trends, top customers by sales, top products by sales, product rating distribution, and customer purchase frequency. These visuals aim to identify growth opportunities, understand customer preferences, and refine product offerings.

Furthermore, the project will focus on integrating technological solutions to enhance the e-commerce platform's functionality and user experience, aiming to create a seamless and personalized shopping journey for customers from browsing to post-purchase support. By implementing the project's recommendations, E-Shop Inc. is set to strengthen its competitive edge, boost customer loyalty, and achieve sustained growth in the dynamic online retail market. This project underscores the critical role of data-driven decision-making in modern business operations and highlights how technology can transform customer experiences and drive business success.

2. Background Information and Marketplace

E-Shop Inc. a fictitious shop, is a thriving, fast-expanding online retail shop that sells a wide range of gift goods for nearly every occasion. E-Shop Inc. began with the objective of making online buying easier, and it has since established itself as one of the most reputable names in the online retail industry. E-Shop Inc. has made its way into many shopping hearts thanks to its devotion to quality, customer happiness, and innovation, as well as its wide range of products that cater to the requirements and aspirations of its customers.

E-Shop Inc. exists in the highly competitive e-commerce marketplace that has experienced exponential growth in the past decade. The online retail industry is characterized by its fast pace,

high customer expectations, and the need for constant innovation (Laudon & Traver, 2018). E-Shop Inc. has to compete against multinational e-commerce giants, while various specialized, smaller online stores form the niche. The key to thriving in this marketplace lies in offering unique products, providing exceptional customer service, and utilizing data-driven insights to stay ahead of trends (Chaffey, et al., 2019)

The worldwide e-commerce sector is driven by rising internet penetration, the proliferation of smartphones, and the convenience of online shopping. The consumer wishes for a hassle-free shopping experience wherein the delivery time is shorter, and the return process is more straightforward while receiving recommendations as per personal choices. E-Shop Inc. ensures this is met through technology in optimizing operations and customer experience.

Product Line and Categories

E-Shop Inc. offers customers an extensive range of options for gifting. The following is the assortment of various ranges but not limited to:

- **Home Décor:** Items that can be used in homes to make them elegant and tasteful.
- **Fashion Accessories:** All trendy accessories for all ages.
- **Personalized Gifts:** Items made to order to provide them and make your special moment personal.
- **Toys and Games:** For kids of all age groups
- **Seasonal Gifts:** Specialty items for the holidays and other special times of celebration.

The product range is constantly being updated by the company to keep up with the latest trends and customer preferences. E-Shop Inc. has a large inventory, and this is an answer to everything, whether it is a birthday, anniversary, holiday, or any other special occasion.

Customer Demographics

E-Shop Inc. has a diverse customer base that includes young professionals, families, and elderly people. The target market includes customers who are high in value for convenience, quality, and unique product offerings of the company. The company's marketing strategies are tailored to reach various customer segments through targeted campaigns, social media engagement, and personalized recommendations (Kotler & Keller, 2016).

This customer orientation element reflects E-Shop Inc.'s commitment to providing its consumers with an excellent buying experience. The website's simplicity, helpful customer service department, and easy return and refund policies are all intended to make customers happy and keep them loyal.

3. Scope of Processes

The scope of processes for E-Shop Inc. encompasses the lifetime of an order from the beginning of customer acquisition to post-purchase customer engagement. These processes include:

- **Customer Acquisition and Engagement:** This process involves acquiring customers through digital marketing strategies. Implementing personalized marketing campaigns based on customer preferences and behaviour (Chaffey, et al., 2019). Customers are engaged on social media, email newsletters, and other platforms.
- **Product Management:** It involves finding high-quality products from the best suppliers. Keep an eye on the inventory to make sure the product is available at the time of the customer's need. It updates the product catalogue regularly with new and trendy products.
- **Order Processing and Fulfillment:** This involves the processing of orders via easy online navigation and safe and secure payment methods. Carry out seamless and hassle-free order processing and packaging quickly. Implementing robust logistics and supply chain management to ensure timely delivery (IBM, 2020).
- **Customer Service and Support:** This involves responsive customer support for inquiries and issue resolution. Flexible and easy policies for return and refund. Customer feedback data analytics for service improvement.
- **Data Management and Analytics:** This involves secure data capture and storage. It uses Data analytics to derive insights from customer behaviour and preferences. Implementing data-driven decision-making to optimize marketing, sales, and operations.
- **Post-Purchase Engagement:** This involves sending tailored follow-up emails to thank consumers and ask for feedback. Reward programs are used to motivate customers to repeat purchases. Also, customers are engaged through information and promotional campaigns.

Technological Integration

To maximize benefits, E-Shop Inc. implements cutting-edge technologies, such as automating business procedures to improve customer experience. The company's powerful e-commerce platform interacted with a variety of third-party apps that handle payment processing, logistics, and customer relationship management. Data analytics and business intelligence tools are employed to analyze sales trends, customer behavior, and inventory levels, enabling informed decision-making and strategic planning (IBM, 2020).

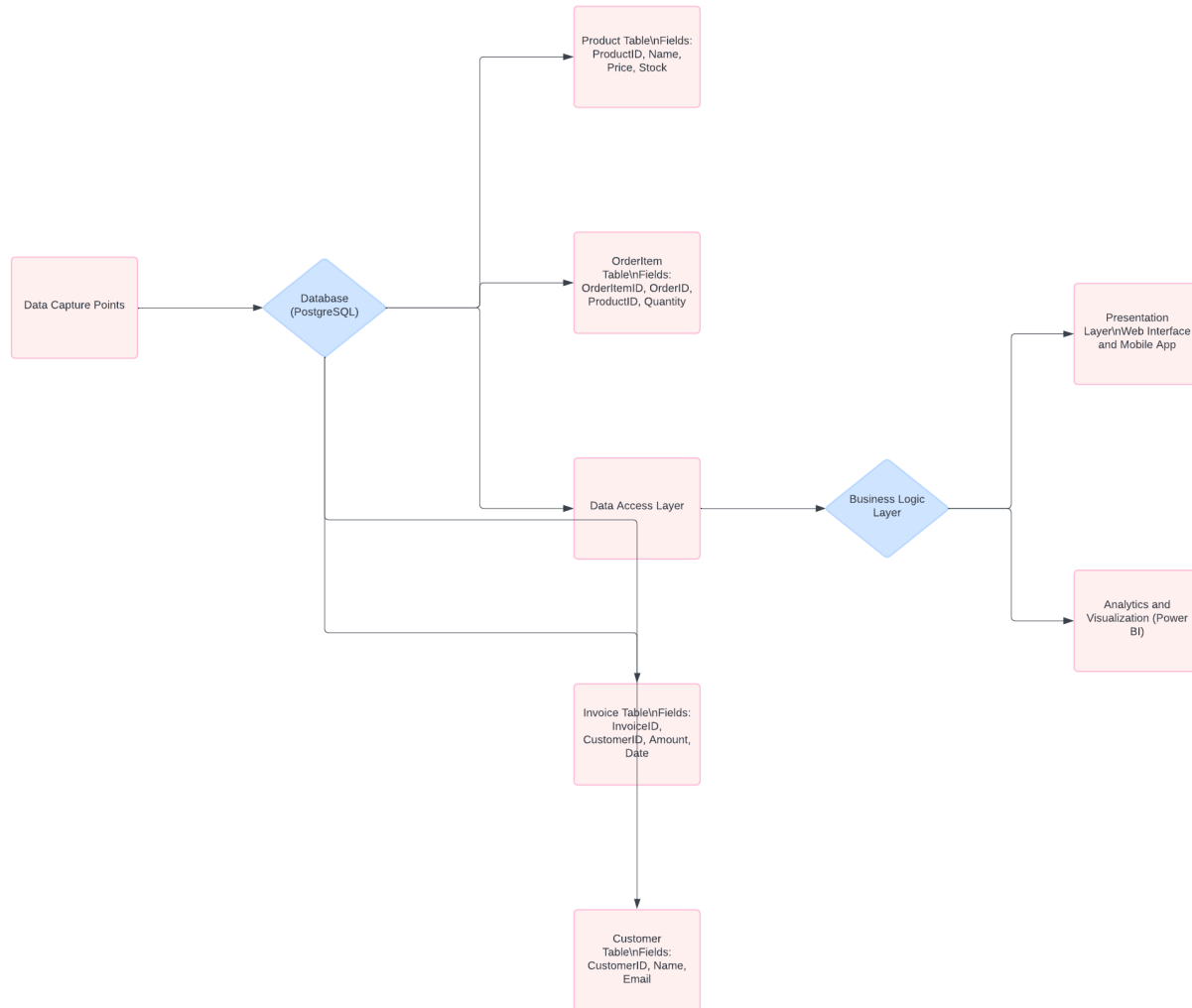
Competitive Advantage

E-Shop Inc. has a competitive advantage in its capacity to provide well-curated products that demonstrate quality and value, a high-end customer service experience, and personalized attention. Innovation and ongoing improvement are key to the company's attempts to remain responsive to market changes and consumer needs. E-Shop Inc., with a strong online presence and a focus on data-driven insights, is poised for success in a highly competitive e-commerce sector.

4. System Design

The system design diagram for E-Shop Inc. depicts the data flow and integration of numerous components used in the company's operations, with a focus on capturing customer interactions, processing transactions, and creating meaningful analytics.

System Design



Here is a brief overview of each component and its roles:

1. **Data Capture points:** In a real-world scenario, these are the initial points where customer interactions and transactions are captured, including inputs from the website, mobile app, and customer service interactions. But in this case, a CSV file containing data on customer interactions and transactions was used. It was downloaded from the UC Irvine Machine Learning Repository. The downloaded dataset does not contain enough data for the analysis, so I used Python scripts to produce synthetic data for customer names, email addresses, addresses, phone numbers, reviews, and ratings, resulting in a more complete dataset

The complete dataset now includes customer details (registration information), transactions, purchase history, product reviews, and ratings.

- 2. Database (PostgreSQL):** This acts as the central repository for all data related to customers, products, orders, and invoices.

The following components are contained in the database:

- **Customer Table:** Stores customer data like CustomerID, FirstName, LastName, Address, Email, PhoneNumber, and Country
- **Invoice Table:** Captures purchase transactions, linking them to customers through CustomerID
- **Product Table:** Contains details about the products, including ProductID, Name, Price, and Stock.
- **OrderItem Table:** Records order-specific details like OrderItemID, OrderID, ProductID, Quantity, and Ratings.

- 3. Data Access Layer:** This facilitates secure and efficient data retrieval and management between the database and the business logic layer. It ensures seamless data flow, protects data integrity, and manages queries to the database.

- 4. Business Logic Layer:** This layer manages the processing of transactions and implementation of business rules. It manages customer authentication, order processing, and service requests, and applies validation rules to maintain data integrity and comply with business policies.

- 5. Presentation Layer:** This provides the user interface through web and mobile platforms. It delivers a user-friendly experience for customers, including personalized content, product recommendations, and promotional offers. It also allows customers to view purchase history, provide reviews, and rate products.

- 6. Analytics and Visualization (Power BI):** It analyzes data and generates visual reports and dashboards.

It contains the following components:

- **Sales Analysis:** Tracks total sales, sales trends, and top-selling products.
- **Customer Insights:** Analyses customer demographics, purchase behaviour, and feedback.
- **Product Performance:** Evaluates product ratings and reviews.
- **Operational Efficiency:** Provides insights into purchase frequency and order data to optimize inventory and supply chain processes.

5. Integration of Customer

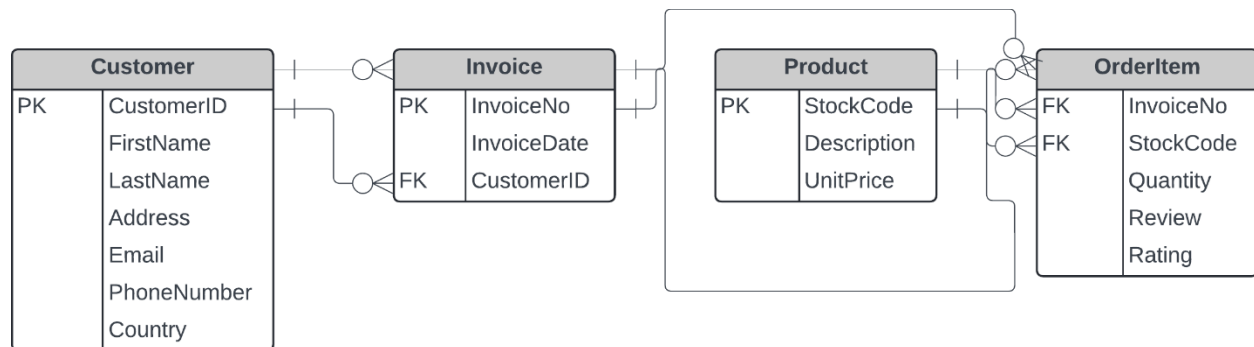
Customer interactions are captured and analysed from the dataset, allowing for more personalized experiences and targeted marketing. Customer feedback is looped back into the system to improve the products and services.

6. Database Design

The Entity relationship diagram shown below visually represents the structure of the database, showing how data entities (table) relate to each other. The ERD is done using Lucidchart

The key entities in the database design effectively capture all necessary information regarding customers, transactions, and products, enabling comprehensive analysis and insights into the E-Shop operations. The key entities that the ERD design for E-Shop Inc. is centred on our Customer, Invoice, Product and OrderItem.

Entity Relationship Diagram



Database Overview:

1. **Customer:** This entity stores information about customers who make purchases using the E-Shop platform.

Attributes:

- **Customer ID (Primary Key):** This is a unique identifier for each customer
- **FirstName:** The first name of the customer

- **LastName:** The last name of the customer
- **Address:** The address of the customer
- **Email:** The email address of the customer
- **PhoneNumber:** The phone number of the customer
- **Country:** The country of the customer.

2. **Invoice:** This entity records the information of each transaction or purchase made by customers.

Attributes:

- **InvoiceNo (Primary Key):** This is a unique identifier for each invoice.
- **InvoiceDate:** This is the date and time when the invoice was generated.
- **CustomerID (Foreign Key):** This links to the CustomerID in the Customer entity, and indicates which customer made the purchase.

3. **Product:** This entity stores information on the products available for sale in the E-Shop.

Attributes:

- **StockCode (Primary Key):** This is a unique identifier for each product.
- **Description:** This is the description of the product.
- **UnitPrice:** This is the price per unit of the product.

4. **OrderItem:** This entity captures the details of individual goods on an invoice, effectively capturing what products were purchased in each transaction.

Attributes:

- **InvoiceNo (Foreign Key):** This links to the InvoiceNo in the Invoice entity, indicating the invoice to which the order item belongs.
- **StockCode (Foreign key):** This links to the StockCode in the Product entity, indicating the product being purchased.
- **Quantity:** This is the quantity of the product ordered.
- **Review:** This is the customer's review of the product.

- **Rating:** This is the customer's rating of the product.

Relationship Between Entities

- **Customer to Invoice:** This is a one-to-many relationship where a single customer can have multiple invoices.
- **Invoice to OrderItem:** This is a one-to-many relationship where a single invoice can have multiple order items.
- **Product to OrderItem:** This is a many-to-one relationship where multiple order items can be associated with a single product.

Data Dictionary

This provides precise and detailed information about the structure of the data in the database, including the description of each field and its data type.

Data Dictionary For E-Shop Inc.:

Customer Table:

Field Name	Data Type	Description
CustomerID	Serial (Primary Key)	Unique identifier for each customer
FirstName	Variable Character (50)	Customer's first name
LastName	Variable Character (50)	Customer's last name
Address	Variable Character (100)	Customer's address
Email	Variable Character (100)	Customer's email address
PhoneNumber	Variable Character (15)	Customer's phone number
Country	Variable Character (50)	Customer's country

Invoice Table:

Field Name	Data Type	Description
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InvoiceNo	Serial (Primary Key)	Unique identifier for each invoice
InvoiceDate	Timestamp without time zone	Data & time of the invoice
CustomerID	Integer (FK)	The foreign key linking to CustomerID

Product Table:

Field Name	Data Type	Description
StockCode	Variable Character (20) (Primary Key)	Unique identifier for each product
Description	Variable Character (100)	Description of the product
UnitPrice	Numeric (10,2)	Price per unit of the product

OrderItem Table:

Field Name	Data Type	Description
InvoiceNo	Integer (Foreign Key)	Foreign Key linking to InvoiceNo
StockCode	Variable Character (20) (Foreign Key)	Foreign Key linking to StockCode
Quantity	Integer	Quantity of the product ordered
Review	Text	Customer's review of the product
Rating	Integer	Customer's rating of the product

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