

Group 2: Management of Organizational Data

Creating a database for the Lucky Store

BY

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1. Background

Lucky Convenience Stores, a well-known chain in West Lafayette, Indiana, is focusing on improving its data management system for its new store located at 117 Northwestern Ave. The proprietor, Mr. Manpreet Singh, currently relies on multiple Excel sheets scattered across different directories for storing data. This method is not only inefficient but also poses potential security risks. To address these concerns, Mr. Singh is keen on transitioning to a more structured and secure database system, causing as little disruption to daily operations as possible. Additionally, he wants the new database to feature specific Key Performance Indicators (KPIs) that will allow for easy querying. He is also looking to expand his business and wants to know what the key insights for his current data are.

As mentioned, beyond just efficient data management, Mr. Singh is eager to obtain actionable insights from this system to enhance revenues. After an in-depth analysis of six meetings with Mr. Singh, we've proposed a data structure organized into seven main tables for the store's operations.

1. **Items:** Contains details about the individual products available for sale, including their price and associated category.
2. **Category:** Lists the various product categories and any associated discounts or compensations.
3. **Customer:** Holds information about the customers, including their names.
4. **Transactions:** Records details of each transaction, including the date, sales figures, payment methods, and associated customer.
5. **PaymentMethod:** Describes the different methods of payment available.
6. **Supplier:** Contains information about the suppliers and the product categories they provide.
7. **ItemSales:** Links individual transactions to the items sold in those transactions.

The dataset provided by the Lucky Store encompasses various aspects of its retail operations. It includes tables detailing items for sale, product categories, customer information, transaction records, payment methods, suppliers, and item sales. This comprehensive dataset offers a holistic view of the store's sales operations, customer interactions, and inventory management.

2. Introduction

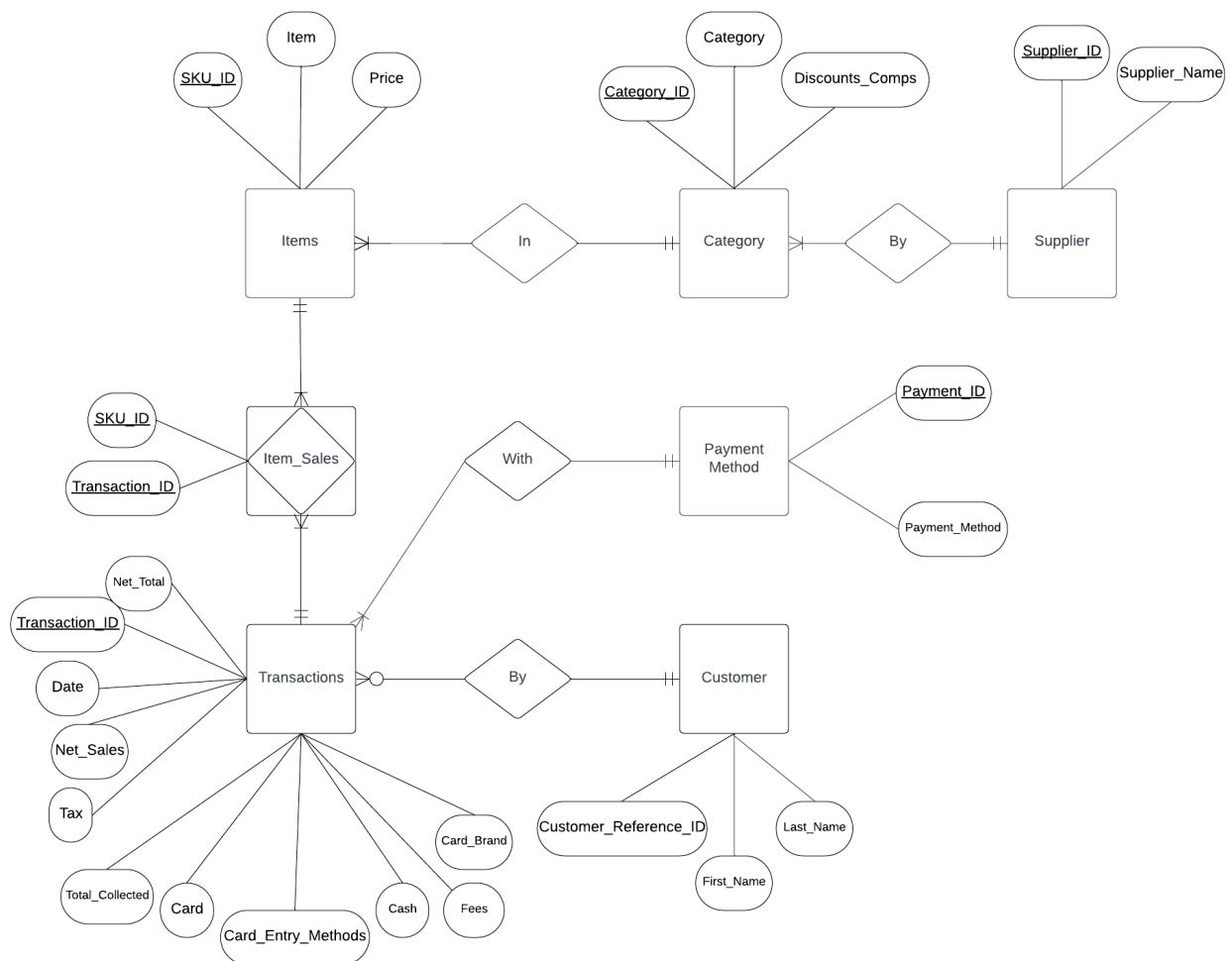
In our collaboration with Lucky Store, our primary objective is to ensure the owner and all other relevant stakeholders of the store can effectively store and manage their data by transforming it from a fragmented Excel-based setup to a robust, efficient, and secure database solution. This will enable the owner to understand the business more and make data-driven decision-making for the everyday operations and smooth running of the business.

Our specific goals for this project are as follows:

- **Operational Efficiency:** By designing and implementing a structured database, we aim to streamline Lucky Store's business operations, making data retrieval, storage, update, and analysis more efficient.
- **Strategic Positioning:** Through real-time organization of inventory and sales transaction data, we will empower Lucky Store to stay on top of insights that minimize stocking up on dead-weight products and align the inventory towards products that are in high demand.

- **Data-Driven Decision Making:** Our database solution will not only store data but also provide actionable insights. By running tailored queries, we will equip Lucky Store with the tools to make informed decisions, drive revenue growth, and optimize customer experience.
- **Leading Digital Transformation:** Acknowledging the critical role of digitalization in today's retail landscape, this collaboration is intended to act as a driving force for Lucky Store's digital transformation endeavor.
- **Empowering Through Accurate Information:** The restructuring of Lucky Store's data into a third normal form (3NF) guarantees data integrity and accuracy. This transformation ensures that Mr. Singh and his associates have access to a trustworthy data source, which will enable them to devise and implement strategies as well as extract more complex insights based on accurate and reliable information.

3. Conceptual Data Modelling



4. Normalization

Normalization:

Before normalization:

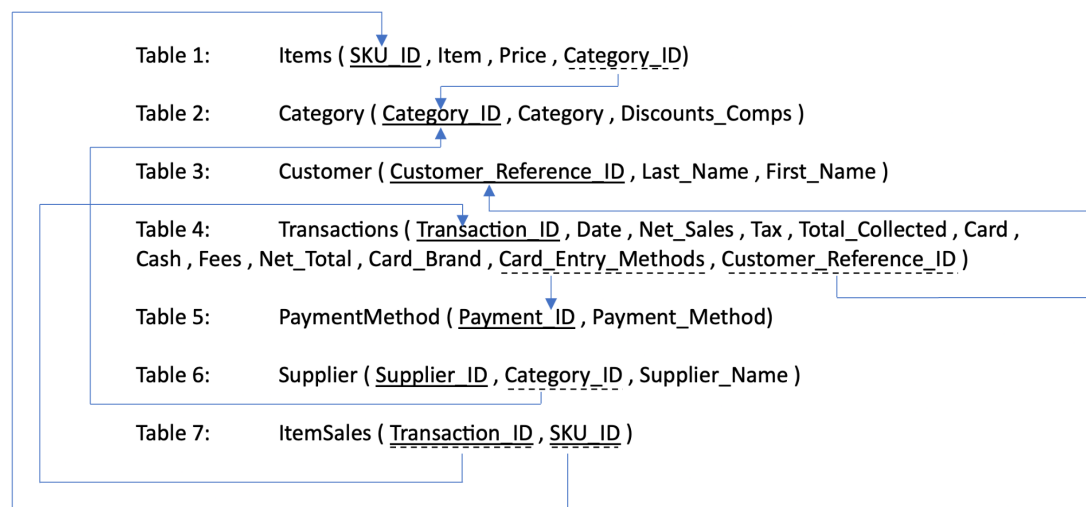
Items (SKU_ID , Item , Price , Category_ID , Category , Supplier_Name , Supplier_ID)

Transactions (Date , Net_Sales , Tax , Total_Collected , Card , Card_Entry_Methods , Cash , Fees , Net_Total , Transaction_ID , Discounts_Comps , Payment_Method , First_Name , Last_Name , SKU_ID , Card_Brand , Customer_Reference_ID)

Determinants and dependents:

- 1) SKU_ID → Item , Price , Category_ID
- 2) Category_ID → Category , Discounts_Comps
- 3) Customer_Reference_ID → Last_Name , First_Name
- 4) Transaction_ID → Date , Net_Sales , Tax , Total_Collected , Card , Cash , Fees , Net_Total , Card_Brand , Card_Entry_Methods , Customer_Reference_ID
- 5) Payment_ID → Payment_Method
- 6) Supplier_ID → Category_ID , Supplier_Name

5. Relational Data Model



6. Business insights (using queries)

1. Total Sales Per Category

- **Business Case:** Determine the revenue generated from each product category to identify top-performing and underperforming categories.

Category	Total_Sales
Beverages	1496.2200000000007
Cigarettes	1405.1700000000005
Beer	1297.67
Candy	1125.6299999999997
Grocery	855.2300000000004

The top category with respect to sales is Beverages (\$1496) followed by Cigarettes (\$1405). The store could look into ordering more items in these categories to maximize opportunity cost.

2. Top 5 Items by Sales

- **Business Case:** Identify the top 5 selling items to focus on inventory stocking and promotional activities.

Item	Total_Sales
Kadobar 2 deal	228
Marlboro Black Menthol Short	176.41
Marlboro Gold Short	175.18
Dunkin Donuts Mocha	154.86
Bowl Chicken	150.82

Mr. Singh's top-selling item is Kadobar with 228 qty being sold in a timeframe of 30 days followed by Marlboro Black Menthol Short with 176.41 and Marlboro Gold Short with 175.18

3. Average Transaction Value by Payment Method

- **Business Case:** Analyze the average spend per transaction for each payment method to optimize payment processing and customer experience.

Payment_Method	Avg_Transaction_Value
Dipped	15.919104477611933
Cash	7.598249027237358
Swiped	22.17232558139535
Tapped	38.50064718162841

The highest average transaction value is through the 'Tapped' payment method where the value is \$38.5.

4. Suppliers and Sales Threshold

- **Business Case:** Identify suppliers associated with high-sales categories to strengthen relationships and negotiate better terms.

Supplier_Name	Category
Sweet Delights Shop	Candy
Sip Sensation Co	Beverages
Leaf Lounge & Tobacco	Cigarettes
Vibrant Veggies Farm	Grocery
Gum World	Gum
Tasty Treats Co.	Chocolate

Shows the categories by supplier names. We can identify which categories from which suppliers are doing well. This might allow the store to stop ordering categories from suppliers that do not reach a certain threshold, i.e., \$10.

5. Customers with Highest Total Purchase Value

- **Business Case:** Identify the store's top-spending customer to tailor personalized offers and enhance customer loyalty.

First_Name	Last_Name	Total_Purchases
Landon	Ehrhardt	1882.98

Landon Ehrhardt has the highest total purchase value of \$1883, these insights can give Mr. Singh a look into his loyal customers and offer discounts and gift cards for increased customer stickiness

6. Total Sales and Average Price per Category

- **Business Case:** Evaluate the total sales and average price of items in each category for pricing strategy and inventory management.

Category	Total_Sales	Avg_Price
Candy	1125.6299999999997	3.636767676767679
Beverages	1496.2200000000007	2.8815822784810163
Cigarettes	1405.1700000000005	9.135066666666667
Grocery	855.2300000000004	4.058059701492541
Gum	10.16	2.89
Chocolate	73.38	3.978333333333334

The highest sales for the category of beverages is \$ 1496 and the average price is \$ 2.88, This is followed by Cigarettes standing at Total sales at \$1405.17 with an average price of \$9.135.

7. Most Popular Payment Method

- **Business Case:** Determine the most commonly used payment method to optimize payment processing solutions and reduce transaction times.

Payment_Method	Transaction_Count
Tapped	479

Tapped is the most popular card method. Mr. Singh can look for a cheaper payment vendor that gives smaller transaction charges since most payments are done through the card with the option of tapping.

8. Customers with Most Transactions

- **Business Case:** Identify highly engaged customers to offer loyalty programs and personalized promotions.

First_Name	Last_Name	Total_Transactions
Evan	Weyer	8
Garrick	Andrews	7
James	Fazio	6
Lichao	Shen	5
Justine	Kapp	5
Bindu	Tuli	5

The highest Transactions being done are by Evan Weyer, followed by Garrick Andrews and James Fazio. This helps in identifying the number of transactions being done by customers and the frequency.

9. Customers' Favorite Card Brands

- **Business Case:** Analyze the popularity of different card brands among customers to optimize card payment services.

COUNT(Card_Brand)	Card_Brand
193	MasterCard
257	
547	Visa
38	Discover
12	American Express

The Card Brand is Visa with 547 transactions. This can be used to identify a payment gateway with Visa discounts which can also be offered to customers.

10. Sales Performance of Suppliers

- **Business Case:** Evaluate suppliers based on the sales of their provided items to optimize supplier relationships and inventory orders.

Supplier_Name	Total_Sales
Sip Sensation Co	1496.2200000000007
Brews Direct	1493.7300000000002
Leaf Lounge & Tobacco	1405.1700000000005
Sweet Delights Shop	1125.6299999999997
Vibrant Veggies Farm	855.2300000000004
Whole Food Traders and Distributors	568.63

The sales performance from each supplier tells us that Sip Sensation Co has the most sales, followed by Brews Direct, Leaf Lounge, and Tobacco. This is good for identifying which products are being sold with regard to the supplier. The Lucky Store could order more from these suppliers.

11. Identify Items Not Sold

- **Business Case:** Identify items that have not been sold to reevaluate their placement, pricing, or continued stocking.

Item
Tylenol
Durex
Tums
Natural electrolytes
Zyn
Red Bull

This is good for identifying products that can be removed from the store and rethinking store supplies. The top 3 items for this query are Tylenol, Durex, and Tums.

12. Category with the Most Items

- **Business Case:** Determine the category with the most diverse range of products for targeted marketing and inventory optimization.

Category	Total_Items
Beverages	72

This is useful in identifying the category that attracts the most attention in the store, and deciding what assortment of products will generate the most revenue, in this instance it will be beverages

13. Customer Count Per Category

- **Business Case:** Assess the number of unique customers per category to identify customer preferences and potential market segments for targeted marketing.

Category	Unique_Customer_Count
Beverages	123
Candy	80
Cigarettes	65
Grocery	60
Beer	46
Chips	33

Most items bought by customers are from the category beverages followed by Candy and Cigarettes. It is useful in determining the categories that need to be constantly in stock and knowing what categories could use better product assortments or more popular brand names. The owner could switch out the brands of chips that are currently in stock for alternative ones.

Each case is aligned with Mr. Singh's objectives for obtaining actionable insights from the data to enhance revenue and improve store performance for Lucky Store.

7. Conclusion

Lucky Convenience Stores in West Lafayette, Indiana, seeks to transition from multiple Excel sheets to a structured and secure database system to improve data management and gain actionable business insights. Our team collaborated to design a database consisting of seven main tables covering aspects like items, transactions, and suppliers. Through various business queries, the team provided Mr. Singh, the proprietor, with insights such as top-selling items, customer behavior, and supplier performance, leading to recommendations for inventory optimization, customer engagement, payment strategy, and digital expansion. Recommendations for Mr. Singh and the Lucky Convenience Stores are:

1. Inventory Optimization and Product Strategy

Beverages & Cigarettes Focus: Given that 'Beverages' and 'Cigarettes' are top-selling categories, ensure they are well-stocked, especially during peak shopping times. Consider adding promotional displays to further highlight top sellers.

Reassess Underperforming Stock: 'Tylenol', 'Durex', and 'Tums' haven't shown sales. Review their placement in the store, consider promotional strategies or consider phasing them out if they continue to underperform.

2. Customer Engagement & Loyalty

Reward Top Customers: 'Landon Ehrhardt', 'Evan Weyer', 'Garrikk Andrews', and 'James Fazio' are our top customers. Consider introducing a loyalty program or personalized discounts to reward their patronage and encourage continued shopping.

Engage More Customers in Top Categories: Beverages, Candy, and Cigarettes attract the most customers. Consider bundling offers or providing discounts on combo purchases to drive more sales in these categories.

3. Payment & Transaction Strategy

Promote Card Payments: The 'Tapped' method is popular. Explore collaborations with card vendors or banks to offer cashback or discounts on card transactions, which can encourage higher spending.

Negotiate Transaction Fees: Given the popularity of Visa, negotiate fees with payment gateway providers to reduce costs. Special promotions or collaborations with Visa can also be explored to drive further sales.

4. Supplier Relations and Inventory Source

Strengthen Ties with Top Suppliers: 'Sip Sensation Co', 'Brews Direct', 'Lead Lounge and Tobacco' are top suppliers. Negotiate bulk purchase discounts, faster deliveries, or exclusive product lines with them to enhance product offerings.

5. Store Layout and Promotion Strategy

Rethink Store Layout: Ensure top-selling items like 'Kadobar' are strategically placed in the store, possibly near the entrance or checkout. This can lead to impulsive purchases.

Engage Customers with Varied Payments: Identify items with distinct payment preferences and strategically place them near payment counters to facilitate quicker decision-making for customers.

6. Data Analytics & Future Expansion

Periodic Data Review: Continue reviewing sales, customer, and payment data periodically to adjust strategies based on evolving trends and customer preferences.

Digital Expansion: Consider implementing an online ordering system or a mobile application, especially given the data-driven insights now available. This can help tap into a younger demographic, offer convenience, and increase overall sales.

By leveraging these insights and recommendations, Mr. Singh can make more informed decisions for the Lucky Convenience Store, ultimately driving increased sales, better customer loyalty, and efficient operations.

8. Attachments



Fig 1. The Lucky Store