**Final Project: Sudha Gold Covering Industries**

# M.S. BAIM

# MGMT 58200 Management of Organizational Data

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# Client Overview and Background

**Sudha Gold Industries** is an imitation jewelry manufacturer based in India. It sells its jewelry in India through one-on-one sales as well as retail. The company began with less than 20 employees in 1975 and has grown to a modest 500-member workforce. The business currently operates in the southern part of India, with buyers spread across regions like Vishakhapatnam, Guntur, Palasa, etc. **Our client** is an **Owner and CEO** of the company.

The company is **currently unorganized in its database management**, collecting data with a MS Access .mdb file to catalog for reference. **Streamlining of the database would improve efficiency**, by identifying product velocity, and thereby predicting when new stock needs to be ordered. Simplifying item search by compiling a product key database would allow for items to be identified in the system more quickly. Additionally, **a database would also help query interesting business findings- such as Top Category sales, Top Salesmen and Seasonality trends.**

The database is still managed at a basic level; no relationships have been defined, and the tables are not linked to automatically update the data. So, if a change is required, it must be manually updated in all tables from the access front end, which is time-consuming work.

**The client conveyed a need to clean the data and extract the tables needed to build a database for an executive overview.** Currently, the client has several unconnected but interdependent databases, attempting to create an efficient model that is effective and compatible with all required entities. If the data allows for forecasting missing business/sales, the client can better manage their resources.

# 1.2 Dataset Description

We received a segregated Access database from the client which had different tables tracking different parts of the business.

This was manually updated every quarter. **The client had to access each table individually and gather important information- such as sales or orders across** **salesmen from these.**

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For our business queries we made use of the following tables- ‘Catalogue,’ ‘invoice detail,’ ‘order details,’ ‘sales detail,’ ‘salesmen detail,’ ‘ship invoice.’

We then derived the following entities out of these tables- **ORDERS, CATALOGUE, SALESMEN, SALES,** and **INVOICES.**

## 1.2.1 Business Case and Cardinalities

* A catalogue design can have many orders. A single order can consist of many catalogue designs in it.
* A Salesman can place multiple orders. However, each order will only have one salesman who places it.
* A Salesman can make multiple sale transactions in a quarter. However, just like orders, a sale will only be made by one salesman.
* A Sale transaction will have one invoice indicating a sale is made to the Buyer Party. A Buyer Party can make multiple sale transactions in any given quarter.
* A sales transaction is also made across a single catalogue design item. But a catalogue design item can have multiple sale transactions for it.

# 1.3 Problem Statement

The client requires a **single database out of segregated Access tables** to have an executive overview of the business. Currently, the unconnected, interdependent tables leave no room to allow for **resource management,** **salesmen hiring, demand forecast or inventory optimization.**

# Project Objectives

Overall, the project objectives would be:

* Cleaning and normalising the Microsoft Access .mdb database file management system.
* Creating a master database for entities such as Sales, Orders, Salesmen, Invoice and Catalogue
* Querying the database in SQL to get executive overview results on demand and performance.

# Conceptual Data Modelling: ERD

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* 1. **Relational Schema**

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Diagram

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**1.7 Data Model and Design Choices:**

The following data was provided by the client:

* **Catalogue:**

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Table 1: (Design\_Number, Status, Description, Model, Group, Sub group, Part Number, Box type, demand, oct 21, month demand, Roll number, Chains per Role, ID, D1, Purchase At)

* **Order details:**

**Table

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Table 2: (Design number , Quantity, salesman id, order number, order person id, Date, Parcel number, Serial number)

* **Sale details:**

Table

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Table 3: (Transaction ID, Design number, Date, qty sold, qty return, sales man ID, pck qty scrap, order number, Remarks, Invoice number, Inv\_Date, Town, Sales man ID, Party Name, ID)

* **Salesman details:**

**Table

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Table 4: (sales man ID, Name, Time line)

We can see that the tables contain mostly atomic values, with some null values that we dropped for our analysis. Other than that, there were no composite or multi-valued attributes. Therefore it was safe to say our dataset was in the 1NF form.

However, we did find redundancies and partial dependencies in our Sales database. We normalized it to 2NF form.

**1NF**

**Table

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**2NF**

Table

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In the process we created two separate entities out of Sales Details- Sales and Invoices.

There were no transitive dependencies in our tables post this. Hence, we can conclude that our database in normalized.

We assigned a primary key to our Orders entity table since it did not have one. We also noticed a many-to-many relationship between our two entities Orders and Catalogue, for which we created an associative entity table Orders\_Catalogue.

Our final database looked like this:

* **SALES:**

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* **INVOICE:**

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* **ORDERS:**

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* **CATALOGUE:**

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* **ORDER\_CATALOGUE**

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* **SALESMEN**

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This is what we used for our ERD. We then uploaded the same on SQL and proceeded with our queries to get business results

# 1.9 Queries and Description (Analysis)

We proceeded with analyzing performances **which affect the business** in the quarter. We focused on the following factors:

* **Seasonality**
* **Revenue and Pricing analysis**
* **Salesman Performance**
* **Inventory Management**

## 1.9.1 Seasonality

### Query 1

*Business Case:* Analyzing seasonal effects, what has been the weekly sales trend for the business each month?

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*Inference:* We calculated the Average Sales Value across the quarter to be about ~₹3.325 Million. We see that the beginning of every month foresees a spike in the orders, which by week 3 onwards then dips. A recommendation would be to restock fast moving items for next month sales.

### Query 2

*Business Case:* Building on this, which products across seasonality and based on the order placed, have been detected with the most defects, and have thus been returned?

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*Inference:* The initial weeks of the month notice a considerably lower return percent, which shoots up towards the end of the month. This suggests that the last week’s higher returns might include be due to buyers returning products bought in the beginning of the month.

## 1.9.2 Pricing and Revenue

### Query 3

*Business Case:* Which are the most popular category of products based on orders and their price?

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*Inference:* Investigating this we found out that buyers have a sensitivity towards price of items, and are not hesitant to pay a premium for a good value, which can be seen through the high orders of Chains and Chevi Chutlu.

### Query 4

*Business Case:* Which locations have contributed the highest revenue for the business?

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*Inference:* We can see that a lot of revenue comes from locations like Kadapa and Hyderabad. This is the western part of Andhra, indicating the business can set up satellite offices in these locations to manage sales better.

## 1.9.3 Salesmen performance

### Query 5

*Business Case:* Which are the top salespeople for the business based on the revenue they brought last quarter?

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*Inference:* Salesman Ashok has bought the highest revenue for the business followed by Anji and Srinu. This suggests that they can leverage their expertise to train other salesmen and onboard new people.

### Query 6

*Business Case:* Now based on the sales quantity, which commodity item has contributed to the most sales for across Salesmen?

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*Inference:* For the top salesman Ashok the most sold Item is chains with the No of items sold at 22970. It has the top selling item for respective salesperson.

### Query 7

*Business Case:* Which are the top buyer parties for the business based on the sales revenue across designs?

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*Inference:* We can see that buyers like Anjanyelu and Phani Garu bring in considerable revenue, and these clients can be targeted for sales and purchasing long term agreements if they have a lot of recurring orders.

## 1.9.4 Inventory management

### Query 8

*Business Case:* Based on prior demand, did the business ‘overestimate’ or ‘underestimate’ their orders based on the forecast?

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*Inference:* We can notice that the business overestimates its demand much more than the quantity sold in the quarter. A recommendation would be to optimize inventory in the coming quarter to increase overall profitability.

### Query 9

*Business Case:* Which designs have generated the generated the highest order volume for the business in the quarter?

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*Inference:* We can see that Chains account for maximum order business in the quarter for the them, which suggests that they can diversify their focus on other categories as well.

### Query 10

*Business Case:* If we take a minimum quantity amount of 2000, which are the product designs that have been returned the most back to the company?

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*Inference:*  We can see that studs and chains observe a higher return order volume compared to other categories, thereby indicating that these products need to go through an overall quality inspection.

# 1.10 Recommendations to the business:

Based on creating and analyzing their database, our group was able to come up with some helpful results that could improve the overall efficiency of the business, increase profitability and reduce inventory dead stock.

An initial recommendation in the beginning of next quarter would be to optimize stock based on the demand patterns. Since the business is overestimating demand, a reduced load could lead to higher profits. Coming to products, an overall quality inspection, especially for chains and studs is required before the coming quarter to reduce default rates. The following inventory optimization strategy will work well for the brand.

Additionally, based on location analysis, a strategy to set up satellite offices in western Andhra could help cater the market better. Salesmen, especially the experienced ones, in these offices could be incentivized well to focus on a diverse set of products.

The recommendations, if implemented in the next quarter will likely show an uptick in sales and increase the overall efficiency of their current manpower.