# Revolutionizing Decision-Making System at ABC Foodmart

**Group 1**

**Jui-Hung Chen**
**Tse An Chen**
**Joanne Lin**
**Shangshan Wang**
**Fangran Liu**
**Ranqiu Xu**

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# Client Scenario

Scenario:

- ABC Foodmart's decision making system is sluggish and error occurs
- Expand the firm by opening more branches in Brooklyn

Basic steps of improving the system:

- Review existing business processes
  - Conduct a thorough analysis
  - Understand how different processes can be interconnected
- Design core ERP system modules
  - Categorize and design core ERP modules to address needs
  - Prepare for data migration
- Implement in different branches
  - Implement the system in different stores
  - Prioritize modules based on importance
  - Design technical support strategies
- Set key metrics and design analytical models
  - Create visible and measurable KPIs
  - Able to accommodate future expansion

# Original Data

| StoreN | Sales $m | Wages $m | NoStaff | Location | Loc'n (Num) | State | State (Num) | AgeYrs | GrossProfit | Adv_1000 | Competitors | HrsTrading | Sundays | sundays | Mng-Sex | Mng-Sex (Num) | Mng-Age | Mng-Exp | Mng-Train | Union% | Car Spaces | HomeDel | HomeDel (Num) | Basket:2013 | Basket:2014 | Gross_Margin | Profit_after_wage |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 12.5 | 2.3 | 60 | Mall | 2 | NSW | 1 | 10 | 0.712 | 171 | 3 | 110 | Sun:No | 0 | Male | 0 | 33 | 12 | 2 | 38 | 46 | Del:No | 0 | $171.00 | $178.00 | 5.7 | 10.2 |
| 2 | 14.5 | 2.7 | 69 | Mall | 2 | Vic | 2 | 8 | 0.091 | 213 | 5 | 134 | Sun:No | 0 | Male | 0 | 33 | 16 | 1 | 38 | 73 | Del:No | 0 | $168.00 | $178.00 | 0.6 | 11.8 |
| 3 | 19 | 3.1 | 79 | Country | 3 | Vic | 2 | 7 | 1.075 | 255 | 2 | 98 | Sun:Yes | 1 | Male | 0 | 30 | 9 | 2 | 39 | 64 | Del:No | 0 | $180.00 | $188.00 | 5.7 | 15.9 |
| 4 | 18.2 | 2.6 | 66 | Mall | 2 | Qld | 3 | 7 | 1.372 | 287 | 1 | 85 | Sun:Yes | 1 | Male | 0 | 29 | 9 | 2 | 38 | 66 | Del:Yes | 1 | $173.00 | $180.00 | 7.5 | 15.6 |
| 5 | 7.6 | 2 | 51 | Strip | 1 | Qld | 3 | 15 | 2.148 | 112 | 0 | 72 | Sun:Yes | 1 | Male | 0 | 36 | 4 | 3 | 40 | 29 | Del:No | 0 | $166.00 | $171.00 | 28.3 | 5.6 |
| 6 | 18.5 | 2.7 | 62 | Country | 3 | Vic | 2 | 6 | 2.019 | 238 | 0 | 77 | Sun:Yes | 1 | Male | 0 | 32 | 15 | 4 | 37 | 40 | Del:Yes | 1 | $183.00 | $192.00 | 10.9 | 15.8 |
| 7 | 13.1 | 2.4 | 61 | Country | 3 | NSW | 1 | 7 | 0.662 | 124 | 2 | 100 | Sun:Yes | 1 | Male | 0 | 52 | 15 | 3 | 37 | 69 | Del:No | 0 | $182.00 | $191.00 | 5.1 | 10.7 |
| 8 | 14.9 | 2.5 | 59 | Mall | 2 | NSW | 1 | 6 | 0.7 | 214 | 2 | 95 | Sun:No | 0 | Male | 0 | 41 | 4 | 3 | 36 | 45 | Del:Yes | 1 | $173.00 | $181.00 | 4.7 | 12.4 |
| 9 | 17.1 | 2.7 | 65 | Country | 3 | WA | 5 | 8 | 0.937 | 215 | 3 | 112 | Sun:No | 0 | Male | 0 | 31 | 12 | 5 | 40 | 42 | Del:No | 0 | $183.00 | $191.00 | 5.5 | 14.4 |
| 10 | 9.2 | 2.1 | 55 | Strip | 1 | Vic | 2 | 16 | 0.065 | 154 | 5 | 135 | Sun:Yes | 1 | Female | 1 | 42 | 13 | 2 | 43 | 34 | Del:No | 0 | $158.00 | $165.00 | 0.7 | 7.1 |
| 11 | 10.3 | 2.2 | 65 | Mall | 2 | Vic | 2 | 10 | 2.144 | 97 | 2 | 100 | Sun:No | 0 | Male | 0 | 32 | 8 | 2 | 40 | 51 | Del:No | 0 | $174.00 | $180.00 | 20.8 | 8.1 |
| 12 | 19.3 | 3.1 | 74 | Mall | 2 | ACT | 8 | 7 | 0.248 | 301 | 2 | 96 | Sun:No | 0 | Male | 0 | 39 | 21 | 5 | 40 | 86 | Del:No | 0 | $174.00 | $184.00 | 1.3 | 16.2 |
| 13 | 8.1 | 1.8 | 43 | Strip | 1 | Vic | 2 | 23 | 1.607 | 123 | 1 | 72 | Sun:Yes | 1 | Female | 1 | 45 | 8 | 3 | 44 | 19 | Del:No | 0 | $163.00 | $170.00 | 19.8 | 6.3 |
| 14 | 9.1 | 3.3 | 78 | Strip | 1 | SA | 4 | 3 | 1.624 | 148 | 0 | 73 | Sun:No | 0 | Male | 0 | 39 | 11 | 4 | 36 | 59 | Del:No | 0 | $168.00 | $175.00 | 17.8 | 5.8 |
| 15 | 15.7 | 2.8 | 67 | Mall | 2 | Vic | 2 | 9 | 1.995 | 228 | 1 | 86 | Sun:No | 0 | Male | 0 | 31 | 13 | 1 | 38 | 70 | Del:No | 0 | $173.00 | $181.00 | 12.7 | 12.9 |
| 16 | 9.8 | 2.1 | 62 | Strip | 1 | NSW | 1 | 16 | 0.588 | 136 | 4 | 121 | Sun:Yes | 1 | Male | 0 | 41 | 10 | 3 | 41 | 44 | Del:No | 0 | $159.00 | $167.00 | 6 | 7.7 |
| 17 | 19.5 | 3.8 | 99 | Strip | 1 | Qld | 3 | 9 | 1.288 | 369 | 1 | 85 | Sun:Yes | 1 | Male | 0 | 31 | 9 | 2 | 38 | 68 | Del:No | 0 | $163.00 | $168.00 | 6.6 | 15.7 |
| 18 | 16.2 | 2.6 | 67 | Country | 3 | NSW | 1 | 8 | 1.908 | 187 | 0 | 73 | Sun:Yes | 1 | Male | 0 | 29 | 13 | 1 | 41 | 45 | Del:No | 0 | $182.00 | $192.00 | 11.8 | 13.6 |
| 19 | 8 | 1.9 | 51 | Mall | 2 | SA | 4 | 12 | 1 | 66 | 1 | 90 | Sun:Yes | 1 | Male | 0 | 34 | 6 | 2 | 40 | 25 | Del:Yes | 1 | $178.00 | $184.00 | 12.5 | 6.1 |
| 20 | 12.2 | 2.6 | 71 | Country | 3 | NSW | 1 | 13 | 0.121 | 116 | 0 | 82 | Sun:Yes | 1 | Female | 1 | 34 | 8 | 2 | 40 | 51 | Del:No | 0 | $185.00 | $193.00 | 1 | 9.6 |
| 21 | 11.1 | 2.4 | 65 | Mall | 2 | Qld | 3 | 3 | 0.159 | 144 | 6 | 168 | Sun:Yes | 1 | Female | 1 | 47 | 16 | 3 | 27 | 59 | Del:No | 0 | $168.00 | $174.00 | 1.4 | 8.7 |
| 22 | 16.8 | 3 | 86 | Country | 3 | NSW | 1 | 8 | 2.284 | 201 | 0 | 80 | Sun:Yes | 1 | Male | 0 | 38 | 10 | 2 | 37 | 78 | Del:No | 0 | $183.00 | $192.00 | 13.6 | 13.8 |
| 23 | 11.8 | 2 | 51 | Country | 3 | NT | 7 | 8 | 0.799 | 96 | 6 | 145 | Sun:Yes | 1 | Male | 0 | 34 | 12 | 2 | 40 | 22 | Del:Yes | 1 | $181.00 | $189.00 | 6.8 | 9.8 |
| 24 | 14 | 2.3 | 56 | Country | 3 | Vic | 2 | 7 | 0.911 | 134 | 3 | 112 | Sun:No | 0 | Male | 0 | 30 | 13 | 1 | 38 | 34 | Del:No | 0 | $178.00 | $185.00 | 6.5 | 11.7 |
| 25 | 10.5 | 2.3 | 60 | Mall | 2 | NSW | 1 | 3 | 0.813 | 101 | 3 | 106 | Sun:No | 0 | Male | 0 | 44 | 8 | 3 | 33 | 45 | Del:No | 0 | $170.00 | $177.00 | 7.7 | 8.2 |
| 26 | 6.2 | 1.6 | 40 | Strip | 1 | Vic | 2 | 14 | 0.976 | 82 | 2 | 101 | Sun:Yes | 1 | Male | 0 | 37 | 5 | 3 | 40 | 9 | Del:No | 0 | $163.00 | $170.00 | 15.7 | 4.6 |
| 27 | 16.9 | 3.4 | 85 | Strip | 1 | WA | 5 | 12 | 1.612 | 311 | 4 | 124 | Sun:Yes | 1 | Male | 0 | 37 | 13 | 2 | 42 | 62 | Del:No | 0 | $164.00 | $171.00 | 9.5 | 13.5 |
| 28 | 7.9 | 1.5 | 35 | Mall | 2 | WA | 5 | 6 | 1.38 | 65 | 1 | 88 | Sun:No | 0 | Male | 0 | 27 | 10 | 6 | 37 | 16 | Del:Yes | 1 | $180.00 | $190.00 | 17.5 | 6.4 |
| 29 | 9.6 | 1.9 | 51 | Country | 3 | NSW | 1 | 6 | 0.498 | 31 | 4 | 117 | Sun:No | 0 | Male | 0 | 30 | 5 | 2 | 36 | 20 | Del:Yes | 1 | $179.00 | $187.00 | 5.2 | 7.7 |
| 30 | 16.3 | 3.7 | 102 | Mall | 2 | SA | 4 | 12 | 0.084 | 249 | 6 | 154 | Sun:Yes | 1 | Male | 0 | 38 | 11 | 2 | 42 | 114 | Del:No | 0 | $170.00 | $177.00 | 0.5 | 12.6 |
| 31 | 11.2 | 2.6 | 70 | Strip | 1 | SA | 4 | 14 | 1.036 | 197 | 0 | 72 | Sun:Yes | 1 | Male | 0 | 35 | 5 | 3 | 42 | 56 | Del:Yes | 1 | $166.00 | $172.00 | 9.3 | 8.6 |
| 32 | 13.1 | 2.5 | 61 | Strip | 1 | NT | 7 | 7 | 0.96 | 213 | 2 | 101 | Sun:Yes | 1 | Male | 0 | 30 | 10 | 5 | 39 | 43 | Del:No | 0 | $168.00 | $173.00 | 7.3 | 10.6 |
| 33 | 8 | 1.8 | 44 | Mall | 2 | SA | 4 | 3 | 1.18 | 69 | 0 | 72 | Sun:Yes | 1 | Male | 0 | 34 | 6 | 2 | 34 | 20 | Del:No | 0 | $178.00 | $183.00 | 14.8 | 6.2 |

# Normalization Plan

**1NF**

| StoreN (PK) | Sales $m | Wages $m | NoStaff | Location | Loc'n (Num) | State | State (Num) |
|---|---|---|---|---|---|---|---|
| | Union% | Car Spaces | HomeDel | HomeDel (Num) | Basket:2013 | Basket:2014 | Gross_Margin |
| | GrossProfit | Adv_1000 | Competitors | HrsTrading | Sundays | sundays | Mng-Sex |
| | Mng-Age | Mng-Exp | Mng-Train | AgeYrs | Profit_after_wage | Mng-Sex (Num) | |

**2NF**

**Storeinfo**

| StoreN (PK) | AgeYrs | State | Location | NoStaff | Competitors | HrsTrading | ManagerNo |
|---|---|---|---|---|---|---|---|

**Revenue**

| StoreN (PK) | Sales $m | GrossProfit | HomeDel | Car Spaces |
|---|---|---|---|---|

**Financial Analysis**

| StoreN (PK) | Wages $m | Adv_1000 | Basket:2013 | Basket:2014 | Gross_Margin | Profit_after_wage |
|---|---|---|---|---|---|---|

**Employees**

| StoreN (PK) | NoStaff | Union% | Mng-Age | Mng-Exp | Mng-Train | Mng-Sex | ManagerNo |
|---|---|---|---|---|---|---|---|

# Normalization Plan

**3NF**

**storeinfo**

| StoreN (PK) | Location | AgeYrs | State | ManagerNo (FK) |
|---|---|---|---|---|

**storedetails**

| StoreN (PK) | NoStaff | Competitors | HrsTrading |
|---|---|---|---|

**revenue**

| StoreN (PK) | Sales $m | GrossProfit |
|---|---|---|

**employees**

| StoreN (PK) | NoStaff | Union% |
|---|---|---|

**manager_detial**

| ManagerNo (PK, FK) | Mng-Train | Mng-Exp |
|---|---|---|

**service**

| StoreN (PK) | HomeDel | Car Spaces |
|---|---|---|

**financial_analysis**

| StoreN (PK) | Gross_Margin | Profit_after_wage |
|---|---|---|

**manager**

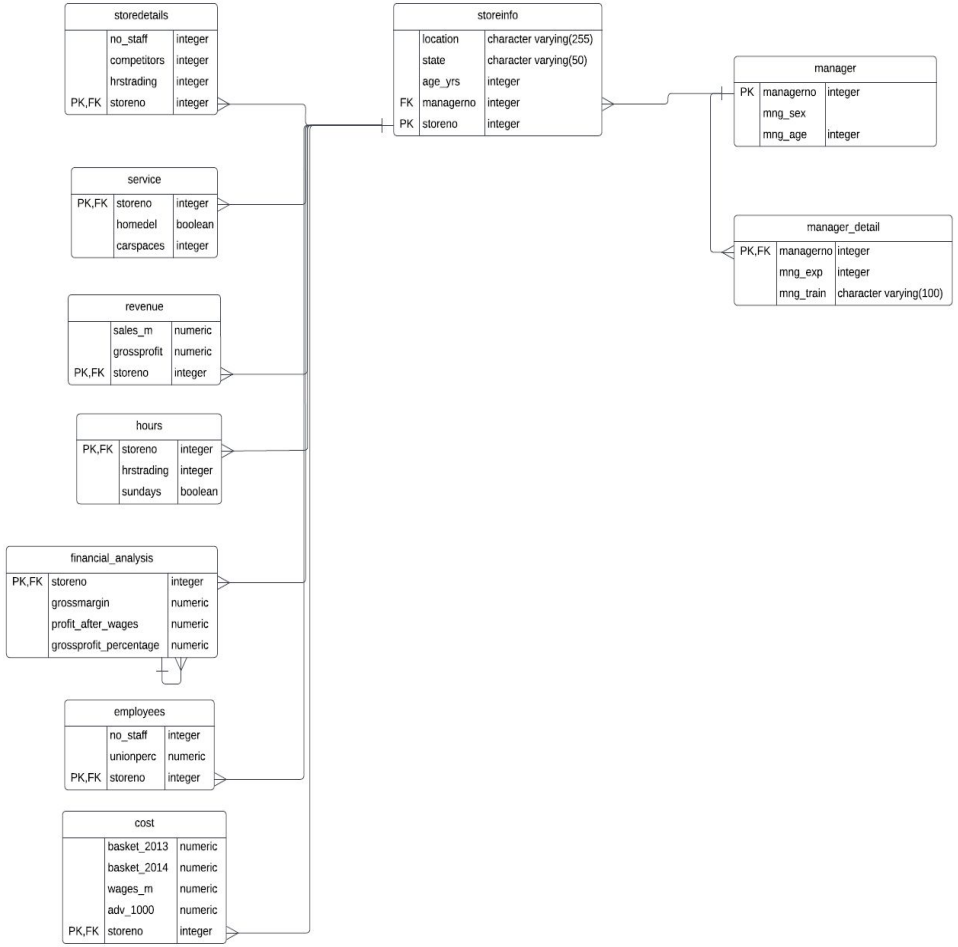
| ManagerNo (PK) | Mng-Age | Mng-Sex |
|---|---|---|

**cost**

| StoreN (PK) | Basket:2013 | Basket:2014 | Wages $m | Adv_1000 |
|---|---|---|---|---|

**hours**

| StoreN (PK) | HrsTrading | Sundays |
|---|---|---|



# ETL Process

- **Extract phase** : Starting by reading the dataset that we obtained from Kaggle. Second, we connected the Postgre SQL by using psycopg in order to insert the SQL code in the Python environment.
- **Transform phase** : In order to properly arrange data into tables, establishing a structured schema is essential. The script defines the SQL commands to create different tables.
- **Load phase**, we import the data into the tables that we created in the transform phase by executing SQL commands.

## Build Tables

```
createCmd = """
CREATE TABLE Manager (
    ManagerNo INT PRIMARY KEY,
    Mng_Sex VARCHAR(10),
    Mng_Age INT
);

CREATE TABLE StoreInfo (
    Location VARCHAR(255),
    State VARCHAR(50),
    Age_Yrs INT,
    ManagerNo INT,
    StoreNo INT PRIMARY KEY,
    FOREIGN KEY (ManagerNo) REFERENCES Manager(ManagerNo)
);
```

## Import data into tables

```
import pandas as pd
from sqlalchemy import create_engine
df = pd.read_csv('/Users/robin/Desktop/APAN-5310/projectdata.csv')
```

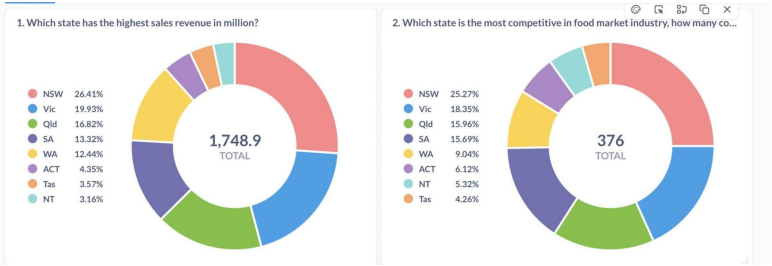
```
#load data into Manager
def load_Manager_data(data):
        for index, row in df.iterrows():
            cur.execute(
                """
                INSERT INTO Manager(Mng_Sex, Mng_Age, ManagerNo)
                VALUES (%s, %s, %s)
                """,
                (row['Mng-Sex'], row['Mng-Age'], index)
            )

load_Manager_data(df)

conn.commit()
```

# Analytical Procedures

- **Why**
  - **Business Goals:**
    - Increase the profitability of supermarkets in Australia & Enhance performance among competitors in each state of Australia
  - **Decision Support:**
    - Marked which location has most sale for consideration of opening new stores
    - Evaluated how effective it is for supermarket on advertisement and its relationship with revenue
    - Identified the relationship between number of staff and store performance
    - Examined the relationship between managers' training hour and profitability
    - Evaluated which state in Australia has the highest sales revenue for benchmark
    - Identified relations between revenues and competitivity in certain state
    - Checked if more services would generate more revenue or not and potentials to increase services
    - Monitored if longer opening hours would generate more revenue or not
    - Evaluated manager's level of experience would influence gross profit or not
- **How**
  - Analyzed annual performance data for each supermarket under its brand, data include employee info, revenue, gross profit, wage, cost of goods sold…etc
  - Created database in PostgreSQL and store raw data into the database
  - Implemented Python as the back-end processing engine that communicates between receiving needs and delivering results
  - Connect PostgreSQL with Tableau to show analysis visually

# Database Interaction

- **Improve decision-making efficiency**: By centrally displaying key data and trends, decision-makers can quickly obtain the information they need to make business decisions faster.
- **Dynamic interactivity**: Users can filter, sort, or drill into data to explore specific questions, which increases the flexibility and depth of analysis.
- **Augmented data visualization:** The use of graphs and maps makes complex data easier to understand, helping to reveal otherwise imperceptible patterns and connections.
- **Support strategic planning:** By comparing performance in different markets, companies can identify strategic opportunities to expand into new markets or strengthen existing markets.




# Thank you!