



Analytics in Retail



BY



16 November 2020



Understand Big Data

**It Reflects Company's
success in reaching and
nurturing the customers**



Case Study (Problem)

This Retail store required to analyze day-to-day transactions and keep track of its customers spreading across various locations along with their purchases/returns across various products categories in difference store type from each transactions.

- To channelize and manage these data with the aim of working in favor of customer and generate profits for survival.
- Build reports to summarize customer buying behavior using metrics such as order value, types of products purchase, recency of purchase, total amount spent in recent transactions.
- Therefore, Data analytics is to apply at all stages of the retail process for tracking of popular products that are emerging, doing forecasts of sales and future demand via predictive simulation, optimizing placements of products and offers through heat-mapping of customers and many others.

Kaggle - <https://www.kaggle.com/darpan25bajaj/retail-case-study-data>



Data Schema

Four sheets of data (23 column) to import to SQL Server Management Studio (SSMS)
and stored in relational databases



Data 1 : Customer

Customer information including part of demographics

Customer.csv



Data 2 : Transactions

Transaction of customers

Transactions.csv



Data 3 : Product Hierarchy code

Product information

prod_cat_info.csv



Data 4 Location

Customer demographics

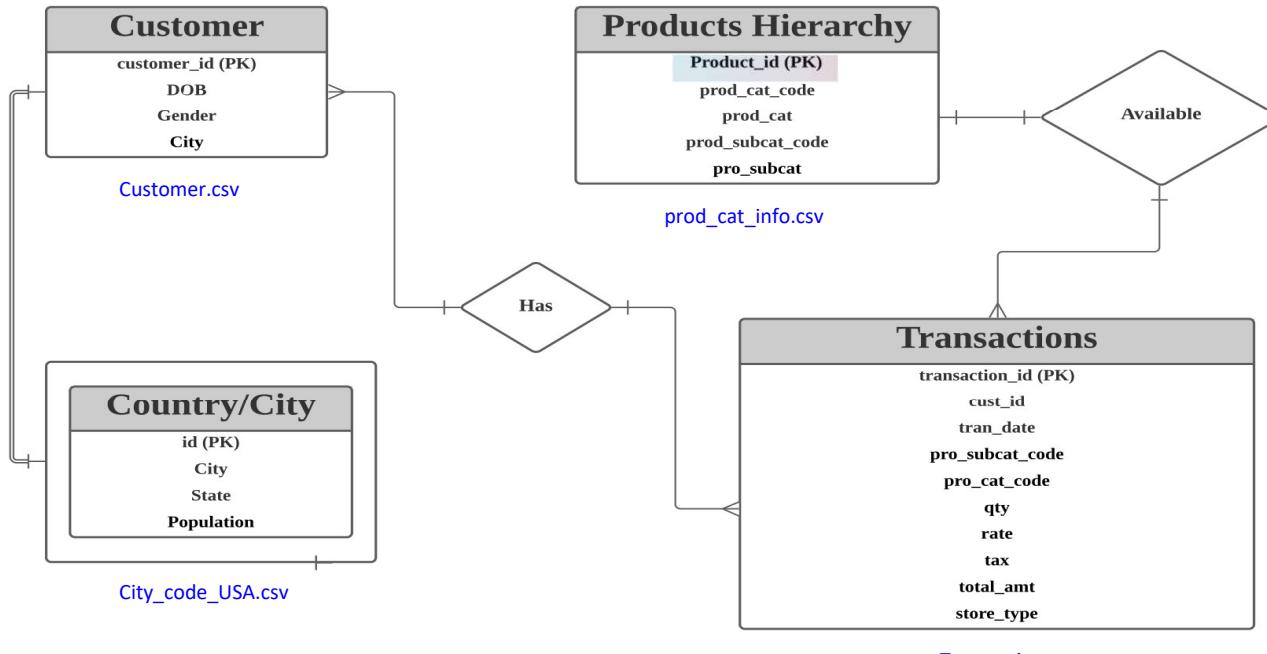
City_code_USA.csv

ER-Diagram

A visual representation of the entity's relationships between the sets of data.



ER Diagram - Analytics in Retail Store



Flat csv Files



Data 2 : Transactions

transaction_id	cust_id	tran_date	prod_subcat_code	prod_cat_code	Qty	Rate	Tax	total_amt	Store_type
80712190438	270351	28/2/2014	1	1	-5	-772	405.3	-4265.3	e-Shop
29258453508	270384	27/2/2014	5	3	-5	-1497	785.925	-8270.925	e-Shop
51750724947	273420	24/2/2014	6					-1748.11	TeleShop

Data 1 : Customer

customer_id	DOB	Gender	city_code
268408	2/1/1970	M	4
269696	7/1/1970	F	8
268159	8/1/1970	F	8
270181	10/1/1970	F	2
268073	11/1/1970	M	1

Data 3 : Product

prod_cat_code	prod_cat	prod_sub_cat_code	prod_subcat
1	Clothing	4	Mens
1	Clothing	1	Women
1	Clothing	3	Kids
2	Footwear	1	Mens

Data 4 Location

id	Country	City	State	Population
1	USA	New York	New York	8622698
2	USA	Los Angeles	California	3999759

Create New Database



CapstoneProject2 – RetailCaseStudy

The screenshot shows the SQL Server Management Studio (SSMS) interface. On the left, the Object Explorer shows a connection to 'DESKTOP-KLUE8FK (SQL Server 15.0.2000.5 - DESKTOP-KLUE8FK\Kenny Lim)'. In the center, a 'New Database' dialog box is open, with the 'Database name:' field set to 'CapstoneProject2 - RetailCaseStudy'. A red arrow points from this field to the 'Object Explorer' on the right. The 'Object Explorer' lists various databases, and 'CapstoneProject2 - RetailCaseStudy' is highlighted in blue. A progress bar at the bottom of the dialog indicates the task is ready. At the bottom of the screen, a status bar shows 'Query executed successfully.' and the system information 'DESKTOP-KLUE8FK (15.0 RTM) DESKTOP-KLUE8FK\Kenny Lim'.

Import & Transform Data with ssms



Diagram illustrating the process of Import & Transform Data with ssms:

```

    graph TD
        subgraph "Object Explorer"
            O1[Object Explorer]
            O2[Object Explorer]
            O3[Object Explorer]
        end

        subgraph "SQL Query Editor"
            Q1[SQLQuery6.sql - DE...]
            Q2[SQLQuery4.sql - not connected]
        end

        subgraph "Specify Input File"
            S1[Specify Input File]
        end

        subgraph "Results Grid"
            R1[Tables]
            R2[Results]
        end

        O1 --> O2
        O2 --> Q1
        O2 --> S1
        O2 --> R1
        Q1 --> S1
        S1 --> R2
        R1 --> R2
        R2 --> Q2
    
```

The diagram shows the flow from Object Explorer to SQL Query Editor, then to the Specify Input File dialog, and finally to the Results grid.

Object Explorer (Top Left):

- Shows databases: AdventureWorks2019, AdventureWorksLT2019, CapstoneProject2, CapstoneProject2 - Refreshment Sales, CapstoneProject2 - RetailCaseStudy.
- CapstoneProject2 - RetailCaseStudy database is selected.
- Tables: Database Diagrams, System Tables, FileTables, External Tables, Graph Tables, dbo.City_code_USA, dbo.Customer.
- Properties for dbo.Customer table are shown.

SQL Query Editor (Top Right):

- Query window: SQLQuery6.sql - DE...FKKenny Lim (83)
- Content: SELECT * FROM Customer; (highlighted with a red box).
- Context menu for Customer table is open, showing options like Tasks, Policies, Facets, Start PowerShell, Azure Data Studio, Reports, Rename, Delete, Refresh, Properties.

Specify Input File Dialog (Center):

- Title: Import Flat File 'CapstoneProject2 - RetailCaseStudy'
- Section: Specify Input File
- Description: This operation will create a table from your input file.
- Location of file to be imported: C:\Users\Kenny Lim\Desktop\Capstone Project2\Retail Case Study\Transactions.csv
- New table name: Transactions
- Table schema: dbo
- Browse... button highlighted with a red box.

Object Explorer (Bottom Left):

- CapstoneProject2 - RetailCaseStudy database is selected.
- Tables: Import Flat File..., Import Data..., Export Data..., Copy Database..., Manage Database Encryption..., Database Upgrade.
- Tables node is expanded, showing tables: dbo.City_code_USA, dbo.Customer, dbo.prod_cat_info, dbo.Transactions.

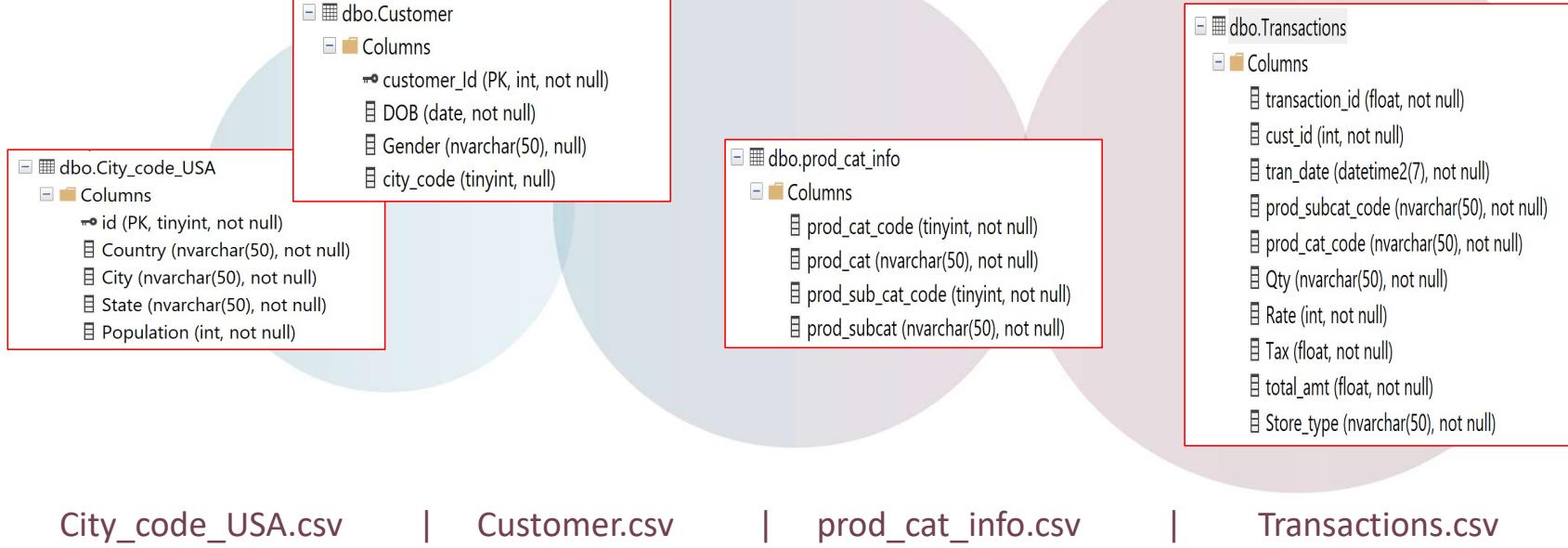
Results Grid (Bottom Right):

- Tables node is highlighted with a red box.
- Results grid shows data for dbo.Transactions table.
- SQL query window: SQLQuery4.sql - not connected
- Content: SELECT * FROM Customer; (highlighted with a red box).
- Results grid shows data for dbo.Transactions table.
- SQL query window: SQLQuery4.sql - not connected
- Content: SELECT * FROM prod_cat_info; (highlighted with a red box).
- Results grid shows data for dbo.Transactions table.
- SQL query window: SQLQuery4.sql - not connected
- Content: SELECT * FROM Transactions; (highlighted with a red box).
- Results grid shows data for dbo.Transactions table.
- SQL query window: SQLQuery4.sql - not connected
- Content: SELECT * FROM City_code_USA;
- Results grid shows data for dbo.Transactions table.



Table Transformed with SQL

With total 23 columns being created in SQL database





Starts Cleaning & Transforming Data with SQL

Master Table

Create & modify Column

Alter Data Type



Object Explorer

Connect ▾

CapstoneProject2 - RetailCaseStudy

- Database Diagrams
- Tables
 - System Tables
 - FileTables
 - External Tables
 - Graph Tables
 - dbo.City_code_USA
 - dbo.Customer
 - dbo.prod_cat_info
 - dbo.Transactions**
 - Columns
 - transaction_id (float, not null)
 - cust_id (int, not null)
 - tran_date (date, null)**
 - prod_subcat_code (nvarchar(50), not null)
 - prod_cat_code (nvarchar(50), not null)
 - Qty (int, not null)**
 - Rate (int, not null)
 - Tax (float, not null)
 - total_amt (float, not null)
 - Store_type (nvarchar(50), not null)
 - Keys
 - Constraints

SQLQuery6.sql - DE..FK(Kenny Lim (83))*

```
--*****DATA PREPARATION (Data cleaning & Transforming)*****  
--=> To change date type format displaying WITHOUT HH:MM:SS since timing shows zero  
Alter Table transactions  
    Alter column tran_date date; --<== to change datatype from Datetime(2) to DATE  
  
Alter Table transactions  
    Alter column tran_date datetime2; --<== to revert back to DateTime(2) datatype format  
  
Alter Table transactions  
    Alter column Qty int not null; --<== to change datatype from NULL to NOT NULL
```

transaction_id	cust_id	tran_date	prod_subcat_code	prod_cat_code	Qty	Rate	Tax	total_amt	Store_type
1	80712190438	2014-02-28	1	1	-5	-772	405.3	-4265.3	e-Shop
2	29258453508	2014-02-27	3	3	-5	-1497	785.925	-8270.925	e-Shop
6			5	5	-2	-791	166.11	-1748.11	TeleShop
11			6	6	-3	-1363	429.345	-4518.345	e-Shop
351		2014-02-28 00:00:00.0000000	1	1					TeleShop
384		2014-02-27 00:00:00.0000000	5	5					TeleShop
420		2014-02-24 00:00:00.0000000	6	6					MBR
509		2014-02-24 00:00:00.0000000	11	11					e-Shop
120		2014-02-23 00:00:00.0000000	6	6					
357		2014-02-23 00:00:00.0000000	8	8					

16 Nov 2020

Create New Column - Product_id Hierarchy code

Primary Key For Actual Products Category



The screenshot shows the Object Explorer and two SQL Query windows in SSMS.

Object Explorer: Shows the database structure, including the `dbo.prod_cat_info` table which contains the `Products_id` column.

SQL Query 1: Adds a new column `Products_id` to the `prod_cat_info` table. The query is:1 ---*SCREENSHOT> To ADD NEW column 'Products_id' in existing table 'prod_cat_info'
Alter Table prod_cat_info
ADD Products_id nvarchar(10) null; --<= Table only allows to add null
Select * from prod_cat_info

Results of SQL Query 1: A table showing the initial state of the `prod_cat_info` table with four rows of data. The last column, `Products_id`, contains four `NULL` values.

	prod_cat_code	prod_cat	prod_sub_cat_code	prod_subcat	Products_id
1	1	Clothing	1	Women	NULL
2	1	Clothing	3	Kids	NULL
3	1	Clothing	4	Mens	NULL
4	2	Footwear	1	Mens	NULL

SQL Query 2: Updates the `Products_id` column to 0 for all rows where it was previously `NULL`. The query is:2 ----> UPDATE & REPLACED column value from NULL to 0(zero)
UPDATE prod_cat_info
SET Products_id = 0
Where Products_id is NULL;

Results of SQL Query 2: A table showing the updated state of the `prod_cat_info` table. All four rows now have a value of 0 in the `Products_id` column.

	prod_cat_code	prod_cat	prod_sub_cat_code	prod_subcat	Products_id
1	1	Clothing	1	Women	0
2	1	Clothing	3	Kids	0
3	1	Clothing	4	Mens	0
4	2	Footwear	1	Mens	0
5	2	Footwear	3	Women	0
6	2	Footwear	4	Kids	0
7	3	Electronics	10	Audio and video	0
8	3	Electronics	4	Mobiles	0
9	3	Electronics	5	Computers	0
10	3	Electronics	8	Personal Appliances	0

Update & Add Constraint Primary Key to prod_cat_info Table



Object Explorer

SQLQuery6.sql - DE...FK(Kenny Lim (83))*

```

1 --> UPDATE & REPLACED column value from NULL to 0(zero)
UPDATE prod_cat_info
SET Products_id = 0
Where Products_id is NULL;

2 --> To UPDATE 'Products_id' datatype to NOT NULL
ALTER TABLE prod_cat_info
Alter column Products_id nvarchar(10) not null;

```

Commands completed successfully.

Completion time: 2020-11-11T15:21:05.3349633+08:00

SQLQuery6.sql - DE...FK(Kenny Lim (52))*

```

-- Insert Product Hierarchy code 'Products_id'
-- (Joining 2 columns 'prod_cat_code'-'prod_sub_cat_code' )

3 UPDATE prod_cat_info
SET Products_id = concat(prod_cat_code, '-', prod_sub_cat_code);

--> Execute to view table below - Transformed table
Select * from prod_cat_info

```

Results

	prod_cat_code	prod_cat	prod_sub_cat_code	prod_subcat	Products_id
1	1	Clothing	1	Women	1-1
2	1	Clothing	3	Kids	1-3
3	1	Clothing	4	Mens	1-4
4	2	Footwear	1	Mens	2-1
5	2	Footwear	3	Women	2-3
6	2	Footwear	4	Kids	2-4
7	3	Electronics	10	Audio and video	3-10
8	3	Electronics	4	Mobiles	3-4

Object Explorer

SQLQuery6.sql - DE...FK(Kenny Lim (52))*

```

4 --> To ADD CONSTRAINT Primary Key to Column "Product_id"
Alter Table dbo.prod_cat_info
ADD constraint pk_Products_id Primary Key (Products_id)

Alter Table prod_cat_info
Drop constraint pk_Products_id

```

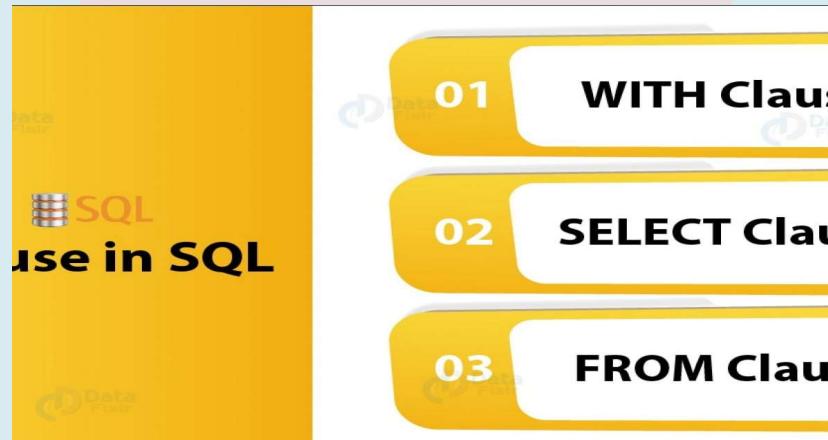
Commands completed successfully.

Completion time: 2020-11-11T16:11:18.5356560+08:00

Product_id Hierarchy code (Actual products Category)



Starts.... Data Analysis with SQL Queries for Insights



Query on Total Amt

FROM Transactions Table



The screenshot displays two SQL queries in the SQL Server Management Studio (SSMS) interface. The top query illustrates how to format the total amount using the `FORMAT` function, while the bottom query shows the raw sum without any formatting.

Top Query (Formatted Results):

```
--> To DISPLAY Total Amt of Sales/REFUND in currencies dollar format
Select format (sum(total_amt), 'C', 'ja-FR') AS [Total_Sales_Amt COLLECTED w/TAX] --'ja' mean dollar sign diaply infront
From Transactions
Where total_amt > 0 AND Qty > 0;
-- Displayed Total Sales Amt COLLECTED with Tax

Select format (sum(total_amt), 'C','fr-FR') AS [Total_Sales_Amt REFUND w/TAX]
From Transactions
Where total_amt < 0 AND Qty < 0;
--'fr' mean dollar sign diaply behind
-- Display Total Sales Amt RETURN/REFUND with Tax
```

Bottom Query (Raw Result):

```
--Diaplay Total Sales Amt Collected/RETURNED without formattting with currucy sign
select * from Transactions;

Select SUM(total_amt) AS Total_Sales_Amt -- Datetype = float without dollar sign
FROM Transactions
Where total_amt > 0 AND Qty > 0;
```

Results:

- Top Query Results:**
 - Total_Sales_Amt COLLECTED w/TAX: €54,453,885.07
 - Total_Sales_Amt REFUND w/TAX: -5 874 113,70 €
- Bottom Query Results:**
 - Total Sales Amt: 54453885.07

Messages:

- Both queries show a green checkmark indicating "Query executed successfully."

JOIN 3 Tables to display Final Sales Report with customer AGE calculated



SQLQuery6.sql - DE...FK\Kenny Lim (52) X

```
--> Merging 3 datasets : 'Customer', 'Product Hierarchy' and 'Transactions'
--> as Final Customer Sales Collection Table with Customer Age
--> Query uses Date Function - DateDIFF() to return customer AGE (Age range)

SELECT pc.Products_id, pc.prod_cat, pc.prod_subcat, c.Gender,
       Datediff(Year,c.DOB, Getdate()) AS Age, t.Qty, t.Rate, ROUND(t.Tax, 2) AS Tax,
       (t.total_amt - t.Tax) AS [Total w/o Tax],
       t.Store_type, c.city_code
FROM Transactions AS t
INNER JOIN prod_cat_info AS pc
ON t.prod_cat_code = pc.prod_cat_code
INNER JOIN Customer AS c
ON t.cust_id = c.customer_Id
INNER JOIN City_code_USA AS cc
ON c.city_code = cc.id AND c.Gender is NOT NULL
WHERE t.Qty > 0 --remove those return (negative figures)
ORDER BY pc.Products_id, t.cust_id;
```

Results Messages

Products_id	prod_cat	prod_subcat	Gender	Age	Qty	Rate	Tax	Total w/o Tax	Store_type	city_code	
1	1-1	Clothing	Women	M	46	1	869	91.25	869	e-Shop	4
2	1-1	Clothing	Women	M	46	3	93	29.3	279	TeleShop	4
3	1-1	Clothing	Women	F	49	4	347	145.74	1388	e-Shop	9
4	1-1	Clothing	Women	F	49	3	774	243.81	2322	MBR	9
5	1-1	Clothing	Women	F	29	4	209	87.78	836	e-Shop	10
6	1-1	Clothing	Women	M	32	4	112	47.04	448	e-Shop	4
7	1-1	Clothing	Women	F	40	5	1013	531.83	5065	TeleShop	3
8	1-1	Clothing	Women	F	39	5	1157	607.42	5785	e-Shop	3
9	1-1	Clothing	Women	F	39	3	347	109.31	1041	e-Shop	3
10	1-1	Clothing	Women	M	46	2	1234	259.14	2468	Flagship store	6
11	1-1	Clothing	Women	F	39	1	1241	130.31	1241	e-Shop	2
12	1-1	Clothing	Women	F	42	1	180	201.6	1020	e-Shop	5

Query executed successfully.

Query Gross Sales by Products (Hierarchy code)



SQLQuery6.sql - DE...FK\Kenny Lim (52)*

```
--> To Query ON Total SALE Amount on each Product Hierarchy type and uses Format Function to add dollar symbol
SELECT * FROM prod_cat_info;

SELECT pc.Products_id, pc.prod_cat, pc.prod_subcat, FORMAT (SUM(t.total_amt), 'C','ja-US') AS [Total_Amt], t.Store_type
FROM Transactions AS t
INNER JOIN prod_cat_info AS pc
ON t.prod_cat_code = pc.prod_cat_code
WHERE pc.Products_id = '1-1'
GROUP BY pc.Products_id, pc.prod_cat, pc.prod_subcat, t.Store_type;

SELECT pc.Products_id, pc.prod_cat, pc.prod_subcat, FORMAT (SUM(t.total_amt), 'C','ja-US') AS [Total_Amt], t.Store_type
FROM Transactions AS t
INNER JOIN prod_cat_info AS pc
ON t.prod_cat_code = pc.prod_cat_code
WHERE pc.Products_id = '1-3'
GROUP BY pc.Products_id, pc.prod_cat, pc.prod_subcat, t.Store_type;
```

80 %

	prod_cat_code	prod_cat	prod_sub_cat_code	prod_subcat	Products_id
1	1	Clothing	1	Women	1-1
2	1	Clothing	3	Kids	1-3
3	1	Clothing	4	Mens	1-4
4	2	Footwear	1	Mens	2-1
5	2	Footwear	3	Women	2-3

	Products_id	prod_cat	prod_subcat	Total_Amt	Store_type
1	1-1	Clothing	Women	\$1,194,423.23	Flagship store
2	1-1	Clothing	Women	\$2,527,193.57	e-Shop
3	1-1	Clothing	Women	\$1,241,834.36	TeleShop
4	1-1	Clothing	Women	\$1,287,686.34	MBR

	Products_id	prod_cat	prod_subcat	Total_Amt	Store_type
1	1-3	Clothing	Kids	\$1,194,423.23	Flagship store
2	1-3	Clothing	Kids	\$2,527,193.57	e-Shop
3	1-3	Clothing	Kids	\$1,241,834.36	TeleShop
4	1-3	Clothing	Kids	\$1,287,686.34	MBR

Query executed successfully.

DESKTOP-KLUE8FK (15.0 RTM) | DESKTOP-KLUE8FK

Query Gross Sales/Refund By Gender



SQLQuery6.sql - DE...FK\Kenny Lim (52)*

```
--> Display Total Sales BY FEMALE
Select format (sum(total_amt), 'C','ja-US' ) AS [Sales Amt by Female]
From Transactions as T
inner join Customer AS C
on C.customer_Id = T.cust_id AND C.Gender = 'F'
Where T.Qty > 0

--> Display Total Sales by MALE
Select format (sum(total_amt), 'C','ja-US' ) AS [Sales Amt by Male]
From Transactions as T
inner join Customer AS C
on C.customer_Id = T.cust_id AND C.Gender = 'M'
Where T.Qty > 0

--> Display Total Sales REFUND by FEMALE
Select format (sum(total_amt), 'C','ja-US' ) AS [Sales RETURN Amt by Female]
From Transactions as T
inner join Customer AS C
on C.customer_Id = T.cust_id AND C.Gender = 'F'
Where T.Qty < 0

--> Display Total Sales RETURN by MALE
Select format (sum(total_amt), 'C','ja-US' ) AS [Sales RETURN Amt by Male]
From Transactions as T
inner join Customer AS C
on C.customer_Id = T.cust_id AND C.Gender = 'M'
Where T.Qty < 0
```

70 %

	Results	Messages
1	\$26,536,068.91	
1	\$27,895,572.51	
1	-\$2,912,555.69	
1	-\$2,959,940.29	

Query executed successfully.

DESKTOP-KLUE8FK

Query Gross Sales by Date for peak sales period



SQLQuery6.sql - DE...FK\Kenny Lim (52)* X

```
--> Query on Gross Sales By MM-YYYY Base on YEAR

Select * from Transactions;

Select Concat(month(t.tran_date), ' - ', YEAR(t.tran_date)) AS [MM-YYYY],
       FORMAT (SUM (total_amt), 'C', 'ja-FR') as Gross_Sales
  FROM Transactions as t
    inner join prod_cat_info as pc
      ON t.prod_cat_code = pc.prod_cat_code
 WHERE t.tran_date is NOT NULL and t.total_amt > 0 AND YEAR(t.tran_date) = 2011
 Group by MONTH(t.tran_date), YEAR(t.tran_date)
 Order by MONTH(t.tran_date), [MM-YYYY] ASC;
```

80 % ▾

Results Messages

	MM-YYYY	Gross_Sales
1	1-2011	€1,602,478.74
2	2-2011	€5,616,127.14
3	3-2011	€6,681,016.75
4	4-2011	€6,579,451.78
5	5-2011	€5,956,541.18
6	6-2011	€5,874,667.31
7	7-2011	€6,355,673.81
8	8-2011	€6,075,798.30
9	9-2011	€7,103,092.49
10	10-2011	€6,746,966.46
11	11-2011	€6,708,480.42
12	12-2011	€6,413,648.74

Query executed successfully.

DESKTOP-KLUE8FK (15.0 RTM) | DESKTOP-KLUE8FK\Kenny .

Create VIEW – A Virtual table for comparison on performance



SQLQuery6.sql - DE...FK\Kenny Lim (58)* X

```
-->Query on Total Nett-Sales by ALL FY-Year
CREATE VIEW [FY-Sales Figure]
AS SELECT Year(t.tran_date) AS FY_YEAR,
           FORMAT (SUM(t.total_amt - t.Tax), 'C', 'ja-fr') AS [Total Nett Sales]
      FROM Transactions AS t
     WHERE t.Qty >= 0 AND t.total_amt >= 0 AND t.tran_date is not null
       GROUP BY YEAR(t.tran_date)
      Go

--<= Select a view
SELECT * FROM [FY-Sales Figure] Order by FY_YEAR;
--<= Drop view
DROP VIEW [FY-Sales Figure]
```

90 %

Results Messages

	FY_YEAR	Total Nett Sales
1	2011	€14,971,501.00
2	2012	€16,115,485.00
3	2013	€15,900,949.00
4	2014	€2,291,599.00

DESKTOP-KLUE8FK (15.0 RTM) | DESKTOP-KLUE8FK\Kenny ... | CapstoneProject2 - Ret... | 00:00:00 | 4 rows

Create SQL stored PROCEDURE



SQLQuery6.sql - DE...FK\Kenny Lim (64)* X

```
--> Create stored PROCEDURE to list individual customer purchase BY customer_id
Create PROCEDURE fetch_customer_purchase @CustomerID int --, @Prod_id nvarchar(5) --<== create PROCEDURE
AS
BEGIN
Select T.cust_id, PC.Products_id, PC.prod_cat, PC.prod_subcat, T.QTY, T.Rate, T.total_amt, T.tran_date
FROM Transactions AS T
inner join prod_cat_info as PC
on T.prod_cat_code = PC.prod_cat_code
Where T.Qty > 0 AND T.total_amt > 0 AND t.cust_id = @CustomerID
ORDER By T.cust_id, tran_date;
END;

EXEC fetch_customer_purchase @CustomerID = '270667' By cust_id
Drop PROCEDURE fetch_customer_purchase; --<== TO DROP PROCEDURE TABLE if NEEDED

Select cust_id from Transactions
```

90 %

Results Messages

	cust_id	Products_id	prod_cat	prod_subcat	QTY	Rate	total_amt	tran_date
1	270667	3-10	Electronics	Audio and video	5	1500	8287.5	2012-08-23
2	270667	3-4	Electronics	Mobiles	5	1500	8287.5	2012-08-23
3	270667	3-5	Electronics	Computers	5	1500	8287.5	2012-08-23
4	270667	3-8	Electronics	Personal Appliances	5	1500	8287.5	2012-08-23
5	270667	3-9	Electronics	Cameras	5	1500	8287.5	2012-08-23
6	270667	4-1	Bags	Mens	3	1336	4428.84	2014-01-20
7	270667	4-4	Bags	Women	3	1336	4428.84	2014-01-20

Query executed successfully.

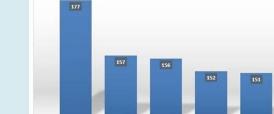
DESKTOP-KLUE8FK (15.0 RTM) DESKTOP-KLUE8FK\Kenny ... CapstoneProject2 -



Create Interactive Dashboard For Insight Visualization

Using Excel Dashboard



Sales Performance Dashboard	Product 1	Product 2	Product 3	Product 4	Overall Performance
	●	○	○	○	●
6 Donette Laxton	192	102	142	157	148
7 Jalisa Stamey	195	172	134	89	148
8 Haley Wadkins	118	155	193	122	147
9 Marcelene Depaola	172	164	198	46	145
10 Sueann Mcwhite	152	188	39	199	145
11 Lavinia Rhoades	178	178	155	59	143
12 Lorraine McLamb	179	138	54	193	141
13 Reanna Rosso	148	153	191	63	139
14 Latrisha Espiritu	163	145	40	200	137
15 Stefani Ptak	198	41	124	163	132
16 Roland Hartwig	24	145	193	163	131
17 Nanci Musgrave	143	167	180	29	130
18 Inell Eggert	113	116	146	141	129
19 Kelvin Alessi	156	126	182	149	128
20 Lynette Brotherton					128
TOP 5 SALES PERFORMANCE BY PRODUCT OVERALL					
					

16 November 2020

Export Final Sale Report from SSMS Query to Excel



The screenshot shows the Microsoft Excel ribbon with the 'Data' tab selected. In the 'Get Data' section of the ribbon, the 'From Database' option is highlighted with a red arrow. A dropdown menu is open, showing various database connection options: 'From File', 'From Database', 'From Azure', 'From Online Services', 'From Other Sources', 'Combine Queries', 'Launch Power Query Editor...', 'Data Source Settings...', and 'Query Options'. The 'From Database' option is also highlighted with a red arrow. A sub-menu titled 'From SQL Server Database' is displayed, with its own list of options: 'From SQL Server Database', 'From Microsoft Access Database', 'From Analysis Services', 'From SQL Server Analysis Services Database (Import)', 'From Oracle Database', 'From IBM Db2 Database', 'From MySQL Database', 'From PostgreSQL Database', and 'From Sybase Database'. The 'From SQL Server Database' option is highlighted with a red arrow. A large callout bubble points to the 'From SQL Server Database' option. A red box highlights the 'SQL statement (optional, requires database)' field, which contains a complex SQL query. A red callout bubble points to this field with the text 'Run SQL query on Excel'. The 'Server' dropdown shows 'DESKTOP-KLUE8FK' and the 'Database (optional)' dropdown shows 'CapstoneProject2 - RetailCaseStudy'.

23

16 November 2020

```
SELECT t.prod_cat_code = pc.prod_cat_code  
INNER JOIN Customer AS c  
ON t.cust_id = c.customer_id  
INNER JOIN City_code_USA AS cc  
ON c.city_code = cc.id AND c.Gender is NOT NULL  
WHERE t.Qty > 0  
ORDER BY t.cust_id;
```

Query Values successful Imported into Excel



DESKTOP-KLUE8FK: CapstoneProject2 - RetailCaseStudy

Products_id	prod_cat	prod_subcat	Gender	Age	Qty	Rate	Tax	Total w/o Tax	Store_type	city_code
1-1	Clothing	Women	M	46	1	869	91.25	869	e-Shop	4
1-1	Clothing	Women	M	46	3	93	29.3	279	TeleShop	4
1-1	Clothing	Women	F	49	4	347	145.74	1388	e-Shop	9
1-1	Clothing	Women	F	49	3	774	243.81	2322	MBR	9
1-1	Clothing	Women	F	29	4	209	87.78	836	e-Shop	10
1-1	Clothing	Women	M	32	4	112	47.04	448	e-Shop	4
1-1	Clothing	Women	F	40	5	1013	531.83	5065	TeleShop	3
1-1	Clothing	Women	F	39	3	347	109.31	1041	e-Shop	3
1-1	Clothing	Women	F	39	5	1157	607.42	5785	e-Shop	3
1-1	Clothing	Women	M	46	2	1234	259.14	2468	Flagship store	6
1-1	Clothing	Women	F	39	1	1241	130.31	1241	e-Shop	2
1-1	Clothing	Women	F	42	4	480	201.6	1920	e-Shop	5
1-1	Clothing	Women	M	29	2	200	42	400	MBR	5
1-1	Clothing	Women	F	50	1	1099	115.39	1099	TeleShop	9
1-1	Clothing	Women	M	47	2	535	112.35	1070	MBR	7
1-1	Clothing	Women						4784	e-Shop	8
1-1	Clothing	Women						1267	MBR	1
1-1	Clothing	Women						4122	Flagship store	1
1-1	Clothing	Women						488	MBR	7
1-1	Clothing	Women						2433	e-Shop	7

Import Data

Select how you want to view this data in your workbook.

- Table
- PivotTable Report
- PivotChart
- Only Create Connection

Where do you want to put the data?

- Existing worksheet: =\$A\$1
- New worksheet

Add this data to the Data Model

Properties... OK Cancel

AutoSave Notes Search Kenny Lim KL

File Home Insert Page Layout Formulas Data Review View Developer Help Table Design Query

Table Name: Query1

Summarize with PivotTable Remove Duplicates Insert Slicer Export Refresh Convert to Range Properties Tools External Table Data Table Style Options Table Styles

A1 Products_id

Products_id	prod_cat	prod_subcat	Gender	Age	Qty	Rate	Tax	Total w/o Tax	Store_type	city_code
1-1	Clothing	Women	M	46	1	869	91.25	869	e-Shop	4
1-1	Clothing	Women	M	46	3	93	29.3	279	TeleShop	4
1-1	Clothing	Women	F	49	4	347	145.74	1388	e-Shop	9
1-1	Clothing	Women	F	49	3	774	243.81	2322	MBR	9
1-1	Clothing	Women	F	29	4	209	87.78	836	e-Shop	10
1-1	Clothing	Women	M	32	4	112	47.04	448	e-Shop	4
1-1	Clothing	Women	F	40	5	1013	531.83	5065	TeleShop	3
1-1	Clothing	Women	F	39	3	347	109.31	1041	e-Shop	3
1-1	Clothing	Women	F	39	5	1157	607.42	5785	e-Shop	3
1-1	Clothing	Women	M	46	2	1234	259.14	2468	Flagship store	6
1-1	Clothing	Women	F	39	1	1241	130.31	1241	e-Shop	2
1-1	Clothing	Women	F	42	4	480	201.6	1920	e-Shop	5
1-1	Clothing	Women	M	29	2	200	42	400	MBR	5
1-1	Clothing	Women	F	50	1	1099	115.39	1099	TeleShop	9
1-1	Clothing	Women	M	47	2	535	112.35	1070	MBR	7
1-1	Clothing	Women	F	28	4	1196	502.32	4784	e-Shop	8

Sheet1 Sheet2 MergedDataSet1 Sheet11 Sheet13

Created Interactive Dashboard for Insights



Create interactive Dashboard

To build a report, choose fields from the PivotTable Field List.

To build a PivotChart, choose fields from the PivotChart Field List.

PivotTable Fields

Choose fields to add to report:

- Qty
- Rate
- Tax
- Total w/o Tax
- Store_type

Drag fields between areas below:

- Filters
- Axis (Categories)
- Legend (Series)
- Values

Gender → Sum of Total w/o Tax

PivotChart & PivotTable

PivotCharts graphically summarize data and help you explore complicated data. PivotTables help you easily arrange and summarize that data in a table.

A	B	C	D	E	F
1 Products_id	(All)				
2					
3 Sum of Total w/o Tax	Column Labels				
4 Row Labels	e-Shop	Flagship store	MBR	TeleShop	Grand Total
5 F	42521305	20502235	20680427	19343090	103047057
6 M	44396585	22108306	21761819	21204349	109471059
7 Grand Total	86917890	42610541	42442246	40547439	212518116

Products Sale by Gender by Shop

Shop Type	Gender	Sale Value (Millions)
e-Shop	F	42.52
Flagship store	F	20.50
MBR	F	20.68
TeleShop	F	19.34
e-Shop	M	44.40
Flagship store	M	22.11
MBR	M	21.76
TeleShop	M	21.20

16 November 2020

Analysis of Data - Overall Total Sale by Store on Female vs Male



Sum of Total w/o Tax Column Labels

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Products_id	(All)											
2													
3	Sum of Total w/o Tax	Column Labels											
4	Row Labels	e-Shop	Flagship store	MBR	TeleShop	Grand Total							
5	F	42521305	20502235	20680427	19343090	103047057							
6	M	44396585	22108306	21761819	21204349	109471059							
7	Grand Total	86917890	42610541	42442246	40547439	212518116							

Products Sale by Gender by Shop

Gender	Store	Sales (\$ Millions)
F	e-Shop	42.52
	Flagship store	20.50
M	e-Shop	44.40
	TeleShop	21.20

Products_id: 1-1, 1-3, 1-4, 2-1, 2-3, 2-4, 3-10, 3-4, 3-5

prod_cat: Bags, Books, Clothing, Electronics, Footwear, Home and kitchen

prod_subcat: Academic, Audio and video, Bath, Cameras, Children, Comics, Computers, DIY, Fiction

Slicers to Query on Individual Product Sale Report



The image illustrates a Microsoft Excel dashboard for querying product sales data. The dashboard consists of three main components:

- PivotTable:** Located at the top left, it shows the "Sum of Total w/o Tax" across different categories. The columns include Row Labels (F, M), Column Labels (e-Shop, Flagship store, MBR, TeleShop, Grand Total), and numerical values.
- Bar Chart:** Titled "Products Sale by Gender", it displays sales in millions for four channels (e-Shop, Flagship store, MBR, TeleShop) categorized by gender (F, M). The chart shows sales values of 2.12, 1.02, 1.02, 0.83 for females and 2.29, 1.23, 1.06, 1.13 for males.
- Slicers:** Located at the bottom right, there are three slicer panes: "Products_id" (values 3-5, highlighted with a red box and arrow), "prod_cat" (values Electronics, Bags, Books, Clothing, Footwear, 3-8, 3-9, 4-1, highlighted with a red box and arrow), and "prod_subcat" (values Computers, Academic, Audio and video, Bath, Cameras, Children, Comics, DIY, highlighted with a red box and arrow).

A red arrow points from the "Products_id" slicer to the "Products_id" column in the PivotTable. Another red arrow points from the "prod_cat" slicer to the "prod_cat" column in the PivotTable. A third red arrow points from the "prod_subcat" slicer to the "prod_subcat" column in the PivotTable.

Excel ribbon tabs visible include File, Home, Insert, Page Layout, Formulas, Data, Review, View, Developer, Help, PivotChart Analyze, Design, Format, and Slicer (which is circled in red).

Page footer: 16 November 2020

Analyze Sales For Female vs Male by Product



Products_id 2-3

Sum of Total w/o Tax Column Labels

Row Labels	e-Shop	Flagship store	MBR	TeleShop	Grand Total
F	1340264	669805	600263	614796	3225128
M	1291230	577687	574241	641280	3084438
Grand Total	2631494	1247492	1174504	1256076	6309566

Products Sale by Gender by Shop

Shop	GENDER	Sales (\$ Millions)
e-Shop	F	1.34
Flagship store	F	0.67
MBR	F	0.60
TeleShop	F	0.61
e-Shop	M	1.29
Flagship store	M	0.58
MBR	M	0.57
TeleShop	M	0.64

Products_id

prod_cat

prod_subcat

28

16 November 2020

Summary

For big retail players, data analytics is a MUST at all stages of the retail process – taking track of popular products that are emerging, doing forecasts of sales and future demand via predictive simulation, optimizing placements of products and offers through heat-mapping of customers and many others.

Customer intelligence is the practice of determining and delivering data-driven insights into past and predicted future customer behavior.

To be effective, customer intelligence must combine raw transactional and behavioral data to generate derived measures.





Thank you!