DATA SCIENCE PROJECT REPORT

(Project Semester August-December 2021)

Sales and Operational Analytics

Submitted by

Arkapriya De

Registration No: 11902078

Computer Science and Engineering Section: KM039

Course Code INT217

Under the Guidance of

Sameeksha Khare

Discipline of CSE/IT

Lovely School of Computer Science and Engineering

Lovely Professional University, Phagwara

CERTIFICATE

This is to certify that Arkapriya De bearing Registration no. 11902078 has completed Data Science project titled, **"Sales and Operational Analytics"** under my guidance and supervision. To the best of my knowledge, the present work is the result of my original development, effort and study.

Sameeksha Khare

Signature and Name of the Supervisor

Asst. Prof

Designation of the Supervisor

School of Computer Science

Lovely Professional University Phagwara, Punjab.

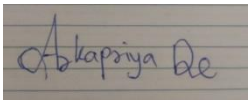
Date:8/12/21

DECLARATION

I,Arkapriya De, student of Lovely Professional University under CSE/IT Discipline at, Lovely Professional University, Punjab, hereby declare that all the information furnished in this assignment is based onmy own intensive work and is genuine.

Name of the student: Arkapriya De

Date:8/12/21

Signature: 

Registration No. 11902078

ACKNOWLEDGEMENT

A project work is a combination of views, ideas, suggestions and contribution of many people. Thus, one of the pleasant parts of writing the report is to thank those who have contributed towards its fulfilment.I consider it as great privilege to have esteemed Lecturer Ms. Sameeksha Khare as my project guide. I take this opportunity to express my sincere gratitude to her through constant advice and constructive criticism nourished my interest in the subject and provided a free and pleasant atmosphere to work against all odd situations. I avail this opportunity to extend my heart full thanks and deep respect to faculty member for their able guidance during this project.

My gratitude to all those, who **responded to my questionnaire** in a well-defined manner and helped me acquiring knowledge.

I would like to communicate a deep sense of gratitude to all these people without whom my project would not have been such a great learning experience.

CONTENT TABLE

Introduction

The term 'Sales analytics' generally refers to the analysis of specific trends or components impacting a company's sales operations. Different analyses provide unique insight into the strengths and weaknesses of a company's sales team, sales management, individual sales reps, or overall sales strategy and Operational analytics is about putting an organization's data to work so everyone can make smart decisions about your business.

'Sales and Operational analytics' is a process where decision-making management regularly meets and reviews projections for demand, supply, and the resulting financial impact. In other words, 'Sales and Operational analytics' is a decision-making process that makes certain that tactical plans in every business area are in line with the overall view of the company's business plan. Especially in large companies with multiple business units and large data files, 'Sales and Operational becomes crucial to ensure the scope, scale and speed of the business operations.

- **Dataset**

Column	Definition
Year	Year wise sales
Month	Month wise Sales
QTR	Quarter wise Sales
Customer Id	Id of the Customers

Product Name	Name of products
Sales Person	Name of the Sales Person
Delivery Units	Name of the delivery units
Region	Name of the Regions
Tier Client	Tier wise Clients
Volume	Total Volume
Unit Price	Unit Price of every product
Unit Cost	Unit Cost of every product
Total Revenue	Sum of Revenue
Total cost	Sum of cost
Total Profit	Sum of profit

Scope of The Analysis

Our Data Analytics delivers the insight, reporting capability and drill-down analysis required for intelligent decision-making throughout the company in direct support of the 'Sales and Operational process. The requirements are:

- Greater visibility of the demand and supply across the enterprise.
- Improved inventory management and planning.
- Increased accuracy in budget forecasting
- Enhanced product lifecycle management process.

I have gathered entire data from Kaggle and I added some extra columns and take references from some other Websites also. And the analysis is all about the following:

Here I have two slicers One slicer is region wise and another is year wise.I have linked these two slicers with all the tables in my database. So all this objectives will be shown year wise and region wise and we also can see these objectives using all button in my Dashboard.

- Display Region wise Distribution of Sales.
- Display Tier Wise count of Sales of Top 10 Sales Person.
- Display Top 5 Salesman Based on Total Revenue.
- Display Tier Wise top 5 Customers.
- Display Quarter Wise Total Revenue.
- Display Profit Distribution Between Delivery Units.
- Display Top 5 Products based on Total Revenue as well as Total Profit.
- Display Monthwise Sales Trendline.
- Display Volume Wise Product Distribution.

Existing System

Before existence of Data Science, analyzing data used to be hectic task and existing system didn't used to analyses the data with perfection.

The Existing system is given as follows:

System Name: SALES ANALYSIS -Dashboard

DRAWBACKS OR LIMITATIONS OF EXISTING SYSTEM:

Following are the benefits which weren't present in the existing system of data analyzing:

1. Making Better Decision with The Help of Data
2. Directing actions based on trends- which later defines the goals required for profit.
3. Doing challenging stuffs with the help of prediction which is done by data.
4. Identifying various opportunities to increase the profit.
5. Making decision with Quantifiable, data driven evidence so that loss doesn't happens.
6. Testing the decisions taken by the data and watching and analyzing the trend.
7. **MATHEMATICAL CALCULATIONS:** The existing system does not have logical conditioning and mathematical calculations such as average, maximum, minimum.
8. **SORTING:** Sorting allows the apps to be sorted by category or cost.

Source of The Dataset

The dataset is taken from Kaggle and I added some extra columns and take references from some other Websites also. Kaggle is a community of data scientists and data enthusiasts. This platform enables you to learn from and mentor each other on your personal, academic, and professional data science journeys.

Kaggle is an online community of data scientists and machine learners, owned by Google, Inc. Kaggle allows users to find and publish data sets, explore and build models in a webbased data-science environment, work with other data scientists and machine learning engineers, and enter competitions to solve data science challenges.

Kaggle got its start by offering machine learning competitions and now also offers a public data platform, a cloudbased workbench for data science, and short form AI education. On 8 March 2017, Google announced that they were acquiring Kaggle. The community spans 194 countries. It is the largest and most diverse data community in the world, ranging from those just starting out too many of the world's best-known researchers.

ETL PROCESS

In computing, extract, transform, load (ETL) is a process in database usage to prepare data for analysis, especially in data warehousing. The ETL process became a popular concept in the 1970s. Data extraction involves extracting data from homogeneous or heterogeneous sources, while data transformation processes data by transforming them into a proper storage format/structure for the purposes of querying and analysis; finally, data loading describes the insertion of data into the final target database such as an operational data store, a data mart, or a data warehouse. A properly designed ETL system extracts data from the source systems, enforces data quality and consistency standards, conforms data so that separate sources can be used together, and finally delivers data in a presentation-ready format so that application developers can build applications and end users can make decisions. Since the data extraction takes time, it is common to execute the three phases in parallel. While the data is being extracted, another transformation process executes while processing the data already received and prepares it for loading while the data loading begins without waiting for the completion of the previous phases. ETL systems commonly integrate data from multiple applications (systems), typically developed and supported by different vendors or hosted on separate computer hardware. The separate systems containing the original data are frequently managed and operated by different employees. For example, a cost accounting system may combine data from payroll, sales, and purchasing.

- ✓ Initially, the raw dataset was arranged as shown in given picture:

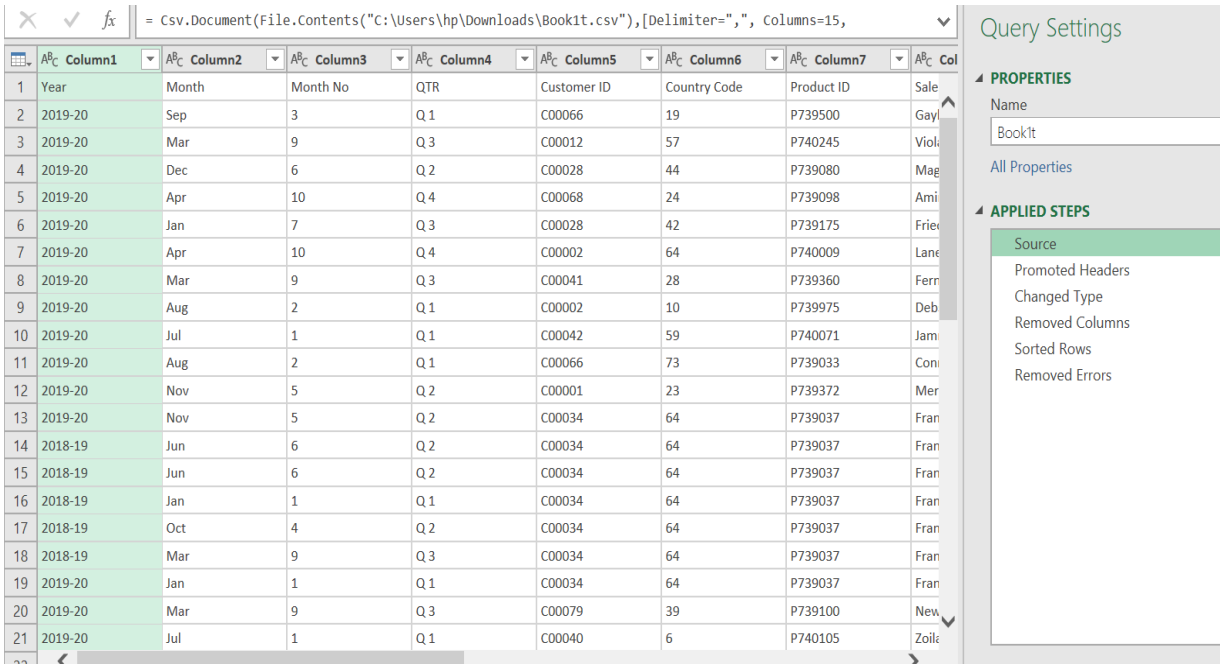
Year	Month	Month No	QTR	Customer	Country C	Product ID	Sales Pers	Sector	Dept	Sub Dept	Region	Tier Client	Volume	Sales
2019-20	Sep	3	Q 1	C00066	19	P739500	Gayle R	Energy	Insurance	TVR	Europe	Tier 2	25500	6118099
2019-20	Mar	9	Q 3	C00012	57	P740245	Viola T	Retail	Insurance	ING	AsiaPac	Tier 1	19500	154879
2019-20	Dec	6	Q 2	C00028	44	P739080	Magen R	Retail	Insurance	HPD	AsiaPac	Tier 1	75000	2955873
2019-20	Apr	10	Q 4	C00068	24	P739098	Amina S	Technolog	Corporate	TVR	Europe	Tier 3	73500	355129
2019-20	Jan	7	Q 3	C00028	42	P739175	Friedman	Oil & Gas	Cmodies	AVT	NthAmeri	Tier 3	70500	325880
2019-20	Apr	10	Q 4	C00002	64	P740009	Lanette E	Oil & Gas	Corporate	TVR	Europe	Tier 3	19500	240587
2019-20	Mar	9	Q 3	C00041	28	P739360	Fernanda	Energy	Invtment	TVR	Europe	Tier 3	15000	241418
2019-20	Aug	2	Q 1	C00002	10	P739975	Debs E	Energy	FOREX	TVR	SthAmeric	Tier 2	49500	602033
2019-20	Jul	1	Q 1	C00042	59	P740071	Jammie T	Telecom	Insurance	HPD	AsiaPac	Tier 1	69000	2E+07
2019-20	Aug	2	Q 1	C00066	73	P739033	Connie B	Technolog	Invtment	TVR	Europe	Tier 1	51000	4254531
2019-20	Nov	5	Q 2	C00001	23	P739372	Mercury F	Oil & Gas	Equity	TVR	Europe	Tier 3	28500	3891955
2019-20	Nov	5	Q 2	C00034	64	P739037	Francona	Banking	Corporate	TVR	Europe	Tier 2	81000	2824078
2018-19	Jun	6	Q 2	C00034	64	P739037	Francona	Energy	Corporate	TVR	Europe	Tier 2	81000	2824078
2018-19	Jun	6	Q 2	C00034	64	P739037	Francona	Mining	Corporate	TVR	Europe	Tier 2	81000	3223129
2018-19	Jan	1	Q 1	C00034	64	P739037	Francona	Oil & Gas	Corporate	TVR	Europe	Tier 2	81000	4578123
2018-19	Oct	4	Q 2	C00034	64	P739037	Francona	Retail	Corporate	TVR	Europe	Tier 2	81000	4578147
2018-19	Mar	9	Q 3	C00034	64	P739037	Francona	Technolog	Corporate	TVR	Europe	Tier 2	81000	9875228
2019-20	Jan	1	Q 1	C00034	64	P739037	Francona	Banking	Corporate	TVR	Europe	Tier 2	81000	1.3E+07
2019-20	Mar	9	Q 3	C00079	39	P739100	Newton I	Retail	FOREX	TVR	SthAmeric	Tier 1	76500	301768
2019-20	Jul	1	Q 1	C00040	6	P740105	Zoila B	Oil & Gas	FOREX	HPD	AsiaPac	Tier 1	85500	3429608
2019-20	Mar	9	Q 3	C00044	2	P739714	Mitzi V	Banking	Cmodies	HPD	AsiaPac	Tier 2	61500	1908190
2019-20	May	11	Q 4	C00048	83	P739462	Elsa C	Technolog	Equity	ING	Africa	Tier 2	64500	1349017
2019-20	Apr	10	Q 4	C00015	55	P739176	DeGenere	Oil & Gas	Cmodies	TVR	SthAmeric	Tier 1	40500	131453
2019-20	Apr	10	Q 4	C00034	28	P739642	Reagan N	Technolog	Insurance	TVR	Europe	Tier 3	73500	5274614
2019-20	Sep	9	Q 3	C00078	24	P739683	Livia S	Healthcar	Equity	TVR	Europe	Tier 2	88500	6775228

Extract:

The first part of an ETL process involves extracting the data from the source system(s). In many cases, this represents the most important aspect of ETL, since extracting data correctly sets the stage for the success of subsequent processes. Most data-warehousing projects combine data from different source systems. Each separate system may also use a different data organization and/or format. Common data-source formats include relational databases, XML, JSON and flat files, but may also include non-relational database structures such as Information Management System (IMS) or other data structures such as Virtual Storage Access Method (VSAM) or Indexed Sequential Access Method (ISAM), or even formats fetched from outside sources by means such as web spidering or screen-scraping.

Steps taken thorough EXTRACT process

- ✓ First, open blank excel file and go to Data from Tab and select From csv and entered data from csv file and then query settings will be visible to us.



	Column1	Column2	Column3	Column4	Column5	Column6	Column7	Col
1	Year	Month	Month No	QTR	Customer ID	Country Code	Product ID	Sale
2	2019-20	Sep	3	Q 1	C00066	19	P739500	Gayl
3	2019-20	Mar	9	Q 3	C00012	57	P740245	Viol
4	2019-20	Dec	6	Q 2	C00028	44	P739080	Mag
5	2019-20	Apr	10	Q 4	C00068	24	P739098	Ami
6	2019-20	Jan	7	Q 3	C00028	42	P739175	Frie
7	2019-20	Apr	10	Q 4	C00002	64	P740009	Lan
8	2019-20	Mar	9	Q 3	C00041	28	P739360	Fern
9	2019-20	Aug	2	Q 1	C00002	10	P739975	Deb
10	2019-20	Jul	1	Q 1	C00042	59	P740071	Jam
11	2019-20	Aug	2	Q 1	C00066	73	P739033	Con
12	2019-20	Nov	5	Q 2	C00001	23	P739372	Mer
13	2019-20	Nov	5	Q 2	C00034	64	P739037	Fran
14	2018-19	Jun	6	Q 2	C00034	64	P739037	Fran
15	2018-19	Jun	6	Q 2	C00034	64	P739037	Fran
16	2018-19	Jan	1	Q 1	C00034	64	P739037	Fran
17	2018-19	Oct	4	Q 2	C00034	64	P739037	Fran
18	2018-19	Mar	9	Q 3	C00034	64	P739037	Fran
19	2019-20	Jan	1	Q 1	C00034	64	P739037	Fran
20	2019-20	Mar	9	Q 3	C00079	39	P739100	New
21	2019-20	Jul	1	Q 1	C00040	6	P740105	Zoil

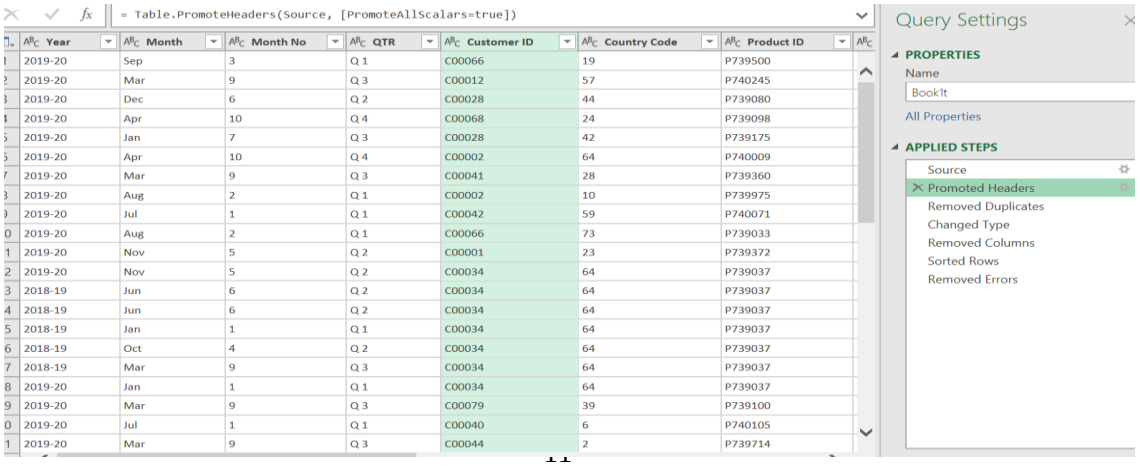
Transform:

In the data transformation stage, a series of rules or functions are applied to the extracted data in order to prepare it for loading into the end target. Some data does not require any transformation at all; such data is known as "direct move" or "pass through" data.

An important function of transformation is the cleaning of data, which aims to pass only "proper" data to the target. The challenge when different systems interact is in the relevant systems' interfacing and communicating. Character sets that may be available in one system may not be so in others.

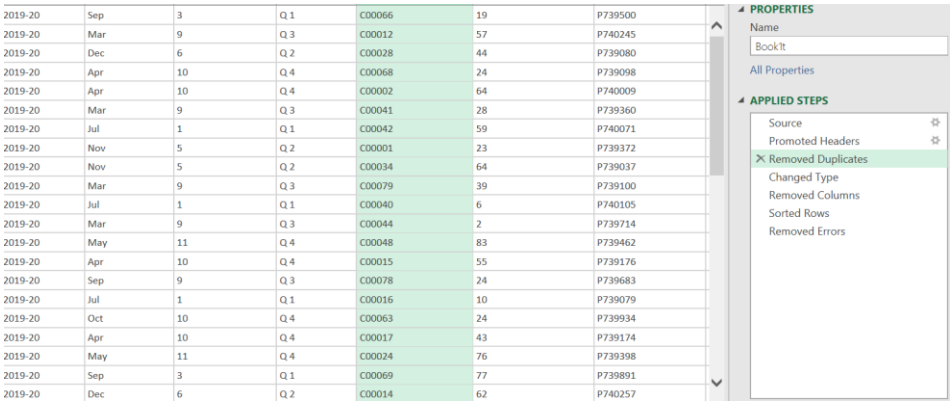
Steps taken thorough TRANSFORM process

- ✓ After entering the query editor, data fields title will promote into header.



Year	Month	Month No	QTR	Customer ID	Country Code	Product ID
2019-20	Sep	3	Q 1	C00066	19	P739500
2019-20	Mar	9	Q 3	C00012	57	P740245
2019-20	Dec	6	Q 2	C00028	44	P739080
2019-20	Apr	10	Q 4	C00068	24	P739098
2019-20	Jan	7	Q 3	C00028	42	P739175
2019-20	Apr	10	Q 4	C00002	64	P740009
2019-20	Mar	9	Q 3	C00041	28	P739360
2019-20	Aug	2	Q 1	C00002	10	P739975
2019-20	Jul	1	Q 1	C00042	59	P740071
2019-20	Aug	2	Q 1	C00066	73	P739033
2019-20	Nov	5	Q 2	C00001	23	P739372
2019-20	Nov	5	Q 2	C00034	64	P739037
2018-19	Jun	6	Q 2	C00034	64	P739037
2018-19	Jun	6	Q 2	C00034	64	P739037
2018-19	Jan	1	Q 1	C00034	64	P739037
2018-19	Oct	4	Q 2	C00034	64	P739037
2018-19	Mar	9	Q 3	C00034	64	P739037
2019-20	Jan	1	Q 1	C00034	64	P739037
2019-20	Mar	9	Q 3	C00079	39	P739100
2019-20	Jul	1	Q 1	C00040	6	P740105
2019-20	Mar	9	Q 3	C00044	2	P739714

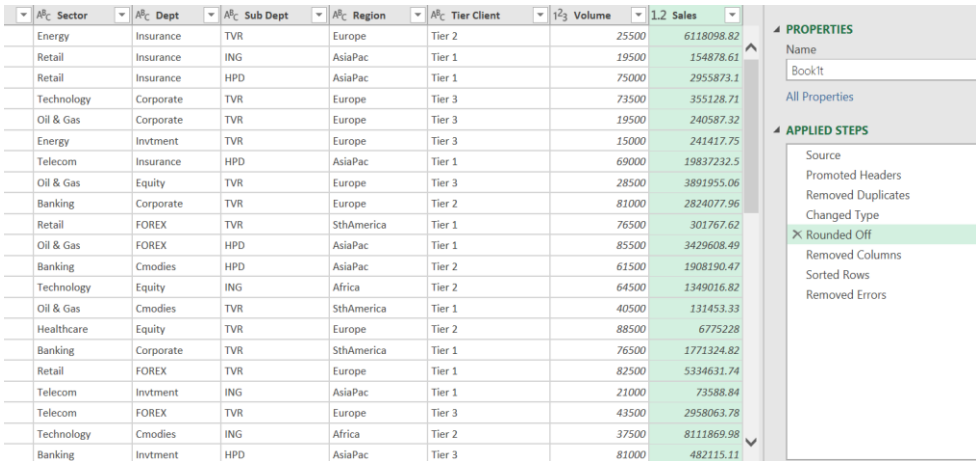
✓ Remove duplicates from the data using duplicate option from home tab.



2019-20	Sep	3	Q 1	C00066	19	P739500
2019-20	Mar	9	Q 3	C00012	57	P740245
2019-20	Dec	6	Q 2	C00028	44	P739080
2019-20	Apr	10	Q 4	C00068	24	P739098
2019-20	Apr	10	Q 4	C00002	64	P740009
2019-20	Mar	9	Q 3	C00041	28	P739360
2019-20	Jul	1	Q 1	C00042	59	P740071
2019-20	Nov	5	Q 2	C00001	23	P739372
2019-20	Nov	5	Q 2	C00034	64	P739037
2019-20	Mar	9	Q 3	C00079	39	P739100
2019-20	Jul	1	Q 1	C00040	6	P740105
2019-20	Mar	9	Q 3	C00044	2	P739714
2019-20	May	11	Q 4	C00048	83	P739462
2019-20	Apr	10	Q 4	C00015	55	P739176
2019-20	Sep	9	Q 3	C00078	24	P739683
2019-20	Jul	1	Q 1	C00016	10	P739079
2019-20	Oct	10	Q 4	C00063	24	P739934
2019-20	Apr	10	Q 4	C00017	43	P739174
2019-20	May	11	Q 4	C00024	76	P739398
2019-20	Sep	3	Q 1	C00069	77	P739891
2019-20	Dec	6	Q 2	C00014	62	P740257

PROPERTIES
Name
Book1t
All Properties
APPLIED STEPS
Source
Promoted Headers
Removed Duplicates
Changed Type
Removed Columns
Sorted Rows
Removed Errors

✓ Changed data type will change the type of some of the data fields to text and did a round figure on sales upto 2 decimal places.

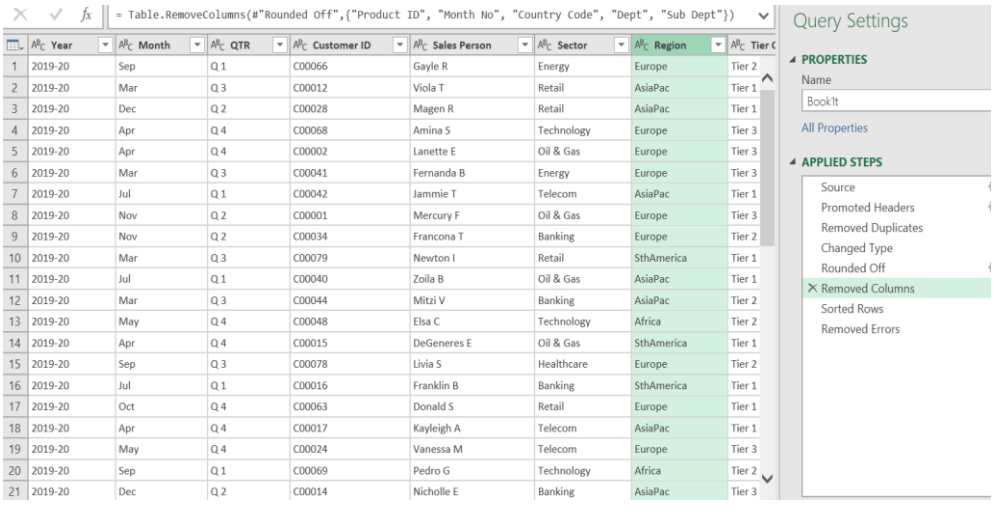


Sector	Dept	Sub Dept	Region	Tier Client	Volume	Sales
Energy	Insurance	TVR	Europe	Tier 2	25500	6118098.82
Retail	Insurance	ING	AsiaPac	Tier 1	19500	154878.61
Retail	Insurance	HPD	AsiaPac	Tier 1	75000	2955873.1
Technology	Corporate	TVR	Europe	Tier 3	73500	355128.71
Oil & Gas	Corporate	TVR	Europe	Tier 3	19500	240587.32
Energy	Invtment	TVR	Europe	Tier 3	15000	241417.75
Telecom	Insurance	HPD	AsiaPac	Tier 1	69000	19837232.5
Oil & Gas	Equity	TVR	Europe	Tier 3	28500	3891955.06
Banking	Corporate	TVR	Europe	Tier 2	81000	2824077.96
Retail	FOREX	TVR	SthAmerica	Tier 1	76500	301767.62
Oil & Gas	FOREX	HPD	AsiaPac	Tier 1	85500	3429608.49
Banking	Cmodies	HPD	AsiaPac	Tier 2	61500	1908190.47
Technology	Equity	ING	Africa	Tier 2	64500	1349016.82
Oil & Gas	Cmodies	TVR	SthAmerica	Tier 1	40500	131453.33
Healthcare	Equity	TVR	Europe	Tier 2	88500	6775228
Banking	Corporate	TVR	SthAmerica	Tier 1	76500	1771324.82
Retail	FOREX	TVR	Europe	Tier 1	82500	5334631.74
Telecom	Invtment	ING	AsiaPac	Tier 1	21000	73588.84
Telecom	FOREX	TVR	Europe	Tier 3	43500	2958063.78
Technology	Cmodies	ING	Africa	Tier 2	37500	8111869.98
Banking	Invtment	HPD	AsiaPac	Tier 3	81000	482115.11

PROPERTIES
Name
Book1t
All Properties
APPLIED STEPS
Source
Promoted Headers
Removed Duplicates
Changed Type
Rounded Off
Removed Columns
Sorted Rows
Removed Errors

✓ Now, from query editor select Home tab and remove column which are not in required for analysis. Column which are removed from dataset are given below:

- Sub Dept
- Dept
- Month No
- Country Code
- Product Id



= Table.RemoveColumns(#"Rounded Off",{"Product ID", "Month No", "Country Code", "Dept", "Sub Dept"})

	Year	Month	QTR	Customer ID	Sales Person	Sector	Region	Tier
1	2019-20	Sep	Q 1	C00066	Gayle R	Energy	Europe	Tier 2
2	2019-20	Mar	Q 3	C00012	Viola T	Retail	AsiaPac	Tier 1
3	2019-20	Dec	Q 2	C00028	Magen R	Retail	AsiaPac	Tier 1
4	2019-20	Apr	Q 4	C00068	Amina S	Technology	Europe	Tier 3
5	2019-20	Apr	Q 4	C00002	Lanette E	Oil & Gas	Europe	Tier 3
6	2019-20	Mar	Q 3	C00041	Fernanda B	Energy	Europe	Tier 3
7	2019-20	Jul	Q 1	C00042	Jammie T	Telecom	AsiaPac	Tier 1
8	2019-20	Nov	Q 2	C00001	Mercury F	Oil & Gas	Europe	Tier 3
9	2019-20	Nov	Q 2	C00034	Francona T	Banking	Europe	Tier 2
10	2019-20	Mar	Q 3	C00079	Newton I	Retail	SthAmerica	Tier 1
11	2019-20	Jul	Q 1	C00040	Zoila B	Oil & Gas	AsiaPac	Tier 1
12	2019-20	Mar	Q 3	C00044	Mitzi V	Banking	AsiaPac	Tier 2
13	2019-20	May	Q 4	C00048	Elsa C	Technology	Africa	Tier 2
14	2019-20	Apr	Q 4	C00015	DeGeneres E	Oil & Gas	SthAmerica	Tier 1
15	2019-20	Sep	Q 3	C00078	Livia S	Healthcare	Europe	Tier 2
16	2019-20	Jul	Q 1	C00016	Franklin B	Banking	SthAmerica	Tier 1
17	2019-20	Oct	Q 4	C00063	Donald S	Retail	Europe	Tier 1
18	2019-20	Apr	Q 4	C00017	Kayleigh A	Telecom	AsiaPac	Tier 1
19	2019-20	May	Q 4	C00024	Vanessa M	Telecom	Europe	Tier 3
20	2019-20	Sep	Q 1	C00069	Pedro G	Technology	Africa	Tier 2
21	2019-20	Dec	Q 2	C00014	Nicholle E	Banking	AsiaPac	Tier 3

Query Settings
PROPERTIES
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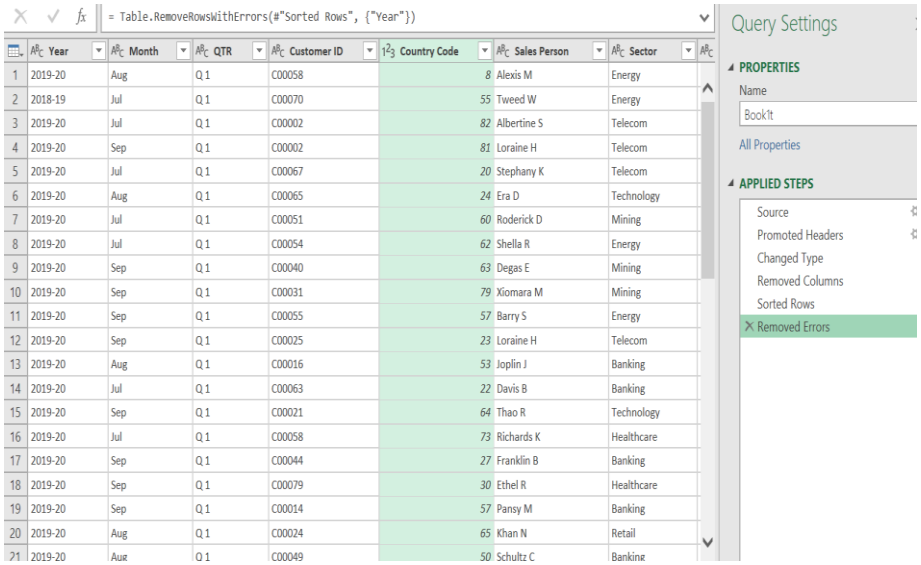
Book1t
All Properties
APPLIED STEPS
Source
Promoted Headers
Removed Duplicates
Changed Type
Rounded Off
Removed Columns
Sorted Rows
Removed Errors

✓ Sort the dataset through filter of rating data fields.

	Year	Month	QTR	Customer ID	Country Code	Sales Person	Sector
1	2019-20	Aug	Q 1	C00075	62	Hershel M	Energy
2	2019-20	Jul	Q 1	C00005	26	Ferdin W	Banking
3	2018-19	Aug	Q 1	C00016	61	Quiana O	Energy
4	2019-20	Jul	Q 1	C00017	81	Hart L	Mining
5	2019-20	Jul	Q 1	C00005	16	Palin M	Oil & Gas
6	2018-19	Aug	Q 1	C00011	43	Abbey D	Telecom
7	2019-20	Aug	Q 1	C00041	25	Eleonor F	Energy
8	2019-20	Aug	Q 1	C00002	20	Annabel S	Healthcare
9	2019-20	Jul	Q 1	C00078	24	Livia S	Retail
10	2018-19	Sep	Q 1	C00028	70	Friedman M	Oil & Gas
11	2019-20	Jul	Q 1	C00025	49	Frank M	Banking
12	2019-20	Sep	Q 1	C00069	77	Pedro G	Technology
13	2019-20	Sep	Q 1	C00048	26	Jae H	Technology
14	2019-20	Aug	Q 1	C00028	78	Alfredo B	Oil & Gas
15	2018-19	Aug	Q 1	C00016	19	Tuibua E	Banking
16	2019-20	Sep	Q 1	C00025	59	Milo L	Oil & Gas
17	2018-19	Jul	Q 1	C00072	75	Stein H	Energy
18	2019-20	Aug	Q 1	C00006	81	Jonson B	Energy
19	2019-20	Aug	Q 1	C00078	22	Marlowe C	Healthcare
20	2019-20	Sep	Q 1	C00076	23	Schop A	Technology

✓ Remove errors from the data using remove error option from home tab.



	Year	Month	QTR	Customer ID	Country Code	Sales Person	Sector
1	2019-20	Aug	Q 1	C00058	8	Alexis M	Energy
2	2018-19	Jul	Q 1	C00070	55	Tweed W	Energy
3	2019-20	Jul	Q 1	C00002	82	Albertine S	Telecom
4	2019-20	Sep	Q 1	C00002	81	Loraine H	Telecom
5	2019-20	Jul	Q 1	C00067	20	Stephany K	Telecom
6	2019-20	Aug	Q 1	C00065	24	Era D	Technology
7	2019-20	Jul	Q 1	C00051	60	Roderick D	Mining
8	2019-20	Jul	Q 1	C00054	62	Shella R	Energy
9	2019-20	Sep	Q 1	C00040	63	Degas E	Mining
10	2019-20	Sep	Q 1	C00031	79	Xiomara M	Mining
11	2019-20	Sep	Q 1	C00055	57	Barry S	Energy
12	2019-20	Sep	Q 1	C00025	23	Loraine H	Telecom
13	2019-20	Aug	Q 1	C00016	53	Joplin J	Banking
14	2019-20	Jul	Q 1	C00063	22	Davis B	Banking
15	2019-20	Sep	Q 1	C00021	64	Thao R	Technology
16	2019-20	Jul	Q 1	C00058	73	Richards K	Healthcare
17	2019-20	Sep	Q 1	C00044	27	Franklin B	Banking
18	2019-20	Sep	Q 1	C00079	30	Ethel R	Healthcare
19	2019-20	Sep	Q 1	C00014	57	Pansy M	Banking
20	2019-20	Aug	Q 1	C00024	65	Khan N	Retail

✓ After cleaning the data, the dataset sample is shown below:

Year	Month	QTR	Customer ID	Sales Person	Sector	Region	Tier Client	Volume	Sales
2019-20	Aug	Q 1	C00057	Tudor J	Technology	NthAmerica	Tier 3	37500	272855.44
2019-20	Aug	Q 1	C00039	Kesey K	Retail	NthAmerica	Tier 3	70500	22732203.89
2019-20	Aug	Q 1	C00009	Elissa L	Oil & Gas	Europe	Tier 1	79500	535792.16
2019-20	Jul	Q 1	C00061	Stallman R	Banking	NthAmerica	Tier 2	66000	94116.61
2019-20	Aug	Q 1	C00027	Norman D	Mining	Africa	Tier 2	61500	3358086.2
2019-20	Sep	Q 1	C00069	Pedro G	Technology	Africa	Tier 2	37500	8111869.98
2019-20	Jul	Q 1	C00064	Hal C	Telecom	Africa	Tier 2	63000	1234726.69
2019-20	Aug	Q 1	C00006	Jonson B	Energy	Europe	Tier 1	91500	8589296.67
2019-20	Aug	Q 1	C00018	Arla L	Mining	AsiaPac	Tier 3	40500	3070894.55
2019-20	Aug	Q 1	C00035	Seigle L	Healthcare	NthAmerica	Tier 1	75000	2585666.94
2019-20	Aug	Q 1	C00010	Pasteur L	Telecom	NthAmerica	Tier 1	36000	86219.53
2019-20	Jul	Q 1	C00008	Eddy D	Retail	AsiaPac	Tier 1	22500	180111.16
2019-20	Aug	Q 1	C00052	Jefferson B	Healthcare	Europe	Tier 1	33000	163362.2
2019-20	Sep	Q 1	C00058	Jordan S	Telecom	Europe	Tier 3	30000	675616.48
2019-20	Sep	Q 1	C00025	Milo L	Oil & Gas	AsiaPac	Tier 1	69000	22099290.52
2019-20	Aug	Q 1	C00056	Tamisha C	Oil & Gas	AsiaPac	Tier 1	34500	8537515.28
2019-20	Jul	Q 1	C00075	Annabell J	Oil & Gas	AsiaPac	Tier 3	55500	44687855.19
2019-20	Sep	Q 1	C00066	Gayle R	Energy	Europe	Tier 2	25500	6118098.82
2019-20	Jul	Q 1	C00042	Jammie T	Telecom	AsiaPac	Tier 1	69000	19837232.5

After that, I perform some more of the following transformation types may be required to meet the business and technical needs of the server or data warehouse:

- Add a new calculated column: (e.g., Total Revenue = volume * unit price).
- Add another new calculated column: (e.g., Total Cost = volume * cost).
- Add another calculated column: (e.g., Total Profit = Total Revenue - Total Cost).

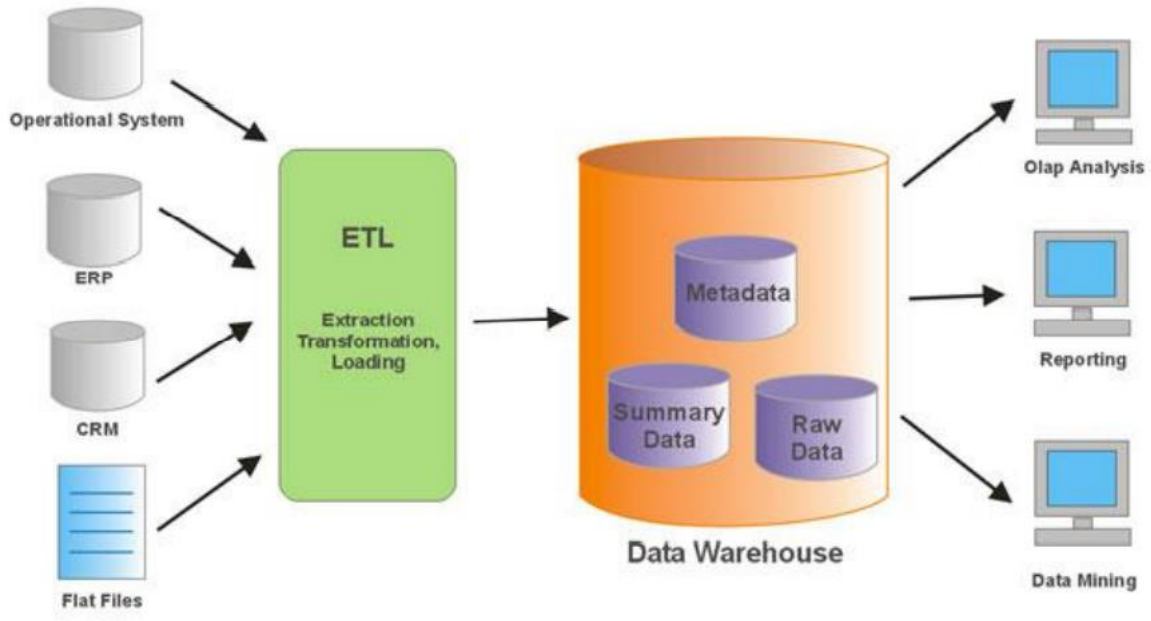
Unit price	Unit Cost	Total Revenue	Total Cost	Total Profit
47.45	31.79	1209975	810645	399330
154.06	90.93	3004170	1773135	1231035
668.27	502.54	50120250	37690500	12429750
255.28	159.42	18763080	11717370	7045710
421.89	364.69	29743245	25710645	4032600
651.21	524.96	12698595	10236720	2461875
205.7	117.11	3085500	1756650	1328850
109.28	35.84	5409360	1774080	3635280
152.58	97.44	10528020	6723360	3804660
81.73	56.67	4168230	2890170	1278060
437.2	263.33	12460200	7504905	4955295
9.33	6.92	755730	560520	195210
827.2	789	67003200	63909000	3094200
989	970	80109000	78570000	1539000
600	569	48600000	46089000	2511000
47.45	31.79	3843450	2574990	1268460
154.06	90.93	12478860	7365330	5113530
668.27	502.54	54129870	40705740	13424130
255.28	159.42	19528920	12195630	7333290
421.89	364.69	36071595	31180995	4890600
651.21	524.96	40049415	32285040	7764375

LOAD:

The load phase loads the data into the end target, which may be a simple delimited flat file or a data warehouse. Depending on the requirements of the organization, this process varies widely. Some data warehouses may overwrite existing information with cumulative information; updating extracted data is frequently done on a daily, weekly, or monthly basis. Other data warehouses (or even other parts of the same data warehouse) may add new data in a historical form at regular intervals—for example, hourly. To understand this, consider a data warehouse that is required to maintain sales records of the last year. This data warehouse overwrites any data older than a year with newer data. However, the entry of data for any one-year window is made in a historical manner. The timing and scope to replace or append are strategic design choices dependent on the time available and the business needs. More complex systems can maintain a history and audit trail of all changes to the data loaded in the data warehouse.

As the load phase interacts with a database, the constraints defined in the database schema — as well as in triggers activated upon data load — apply (for example, uniqueness, referential integrity, mandatory fields), which also contribute to the overall data quality performance of the ETL process.

For example, a financial institution might have information on a customer in several departments and each department might have that customer's information listed in a different way. The membership department might list the customer by name, whereas the accounting department might list the customer by number. ETL can bundle all these data elements and consolidate them into a uniform presentation, such as for storing in a database or data warehouse.



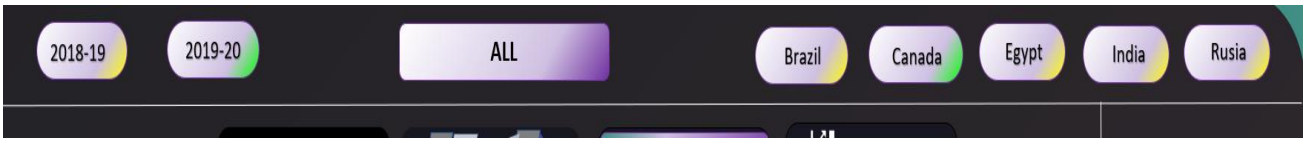
In our scenario, dataset is Sales.csv, so during the ETL process the data is extracted from this dataset, transformed to eliminate irrelevant data mentioned in the scope of analysis section and loaded into the excel where the required data resides. From this analysis reporting can be done.

Finally, after cleaning the data, the final dataset sample is shown below:

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
ear	Month	QTR	Customer ID	Product Name	Sales Person	Delivery Units	Region	Tier Client	Volume	Unit price	Unit Cost	Total Revenu	Total Cost	Total Profi
019-20	Sep	Q 1	C00066	Cement	Gayle R	Energy	India	Tier 2	25500	47.45	31.79	1209975	810645	3
019-20	Mar	Q 3	C00012	Bricks	Viola T	Retail	Canada	Tier 1	19500	154.06	90.93	3004170	1773135	12
019-20	Dec	Q 2	C00028	Roof Tiles	Magen R	Retail	Canada	Tier 1	75000	668.27	502.54	50120250	37690500	124
019-20	Apr	Q 4	C00068	Masonary Mater	Amina S	Technology	India	Tier 3	73500	255.28	159.42	18763080	11717370	70
019-20	Jan	Q 3	C00028	Concrete	Friedman M	Oil & Gas	Brazil	Tier 3	70500	421.89	364.69	29743245	25710645	40
019-20	Apr	Q 4	C00002	Building Blocks	Lanette E	Oil & Gas	India	Tier 3	19500	651.21	524.96	12698595	10236720	24
019-20	Mar	Q 3	C00041	Concrete Admixt	Fernanda B	Energy	India	Tier 3	15000	205.7	117.11	3085500	1756650	13
019-20	Aug	Q 1	C00002	Gypsum Powder	Debs E	Energy	Rusia	Tier 2	49500	109.28	35.84	5409360	1774080	36
019-20	Jul	Q 1	C00042	Morter	Jammie T	Telecom	Canada	Tier 1	69000	152.58	97.44	10528020	6723360	38
019-20	Aug	Q 1	C00066	Morter Admixtu	Connie B	Technology	India	Tier 1	51000	81.73	56.67	4168230	2890170	12
019-20	Nov	Q 2	C00001	Glass	Mercury F	Oil & Gas	India	Tier 3	28500	437.2	263.33	12460200	7504905	49
019-20	Nov	Q 2	C00034	Ceramics	Francona T	Banking	India	Tier 2	81000	9.33	6.92	755730	560520	1
018-19	Jun	Q 2	C00034	Steel	Francona T	Energy	India	Tier 2	81000	827.2	789	67003200	63909000	30
018-19	Jun	Q 2	C00034	Stone	Francona T	Mining	India	Tier 2	81000	989	970	80109000	78570000	15
018-19	Jan	Q 1	C00034	Plaster	Francona T	Oil & Gas	India	Tier 2	81000	600	569	48600000	46089000	25
018-19	Oct	Q 2	C00034	Cement	Francona T	Retail	India	Tier 2	81000	47.45	31.79	3843450	2574990	12
018-19	Mar	Q 3	C00034	Bricks	Francona T	Technology	India	Tier 2	81000	154.06	90.93	12478860	7365330	51
019-20	Jan	Q 1	C00034	Roof Tiles	Francona T	Banking	India	Tier 2	81000	668.27	502.54	54129870	40705740	134
019-20	Mar	Q 3	C00079	Masonary Mater	Newton I	Retail	Rusia	Tier 1	76500	255.28	159.42	19528920	12195630	73
019-20	Jul	Q 1	C00040	Concrete	Zeila R	Oil & Gas	Canada	Tier 1	85500	421.89	364.69	36071595	31180995	48

Analysis of Dataset

In this Dashboard I have two slicers One slicer is region wise and another is year wise. I have linked these two slicers with all the tables in my database. So all this objectives will be shown year wise and region wise and we also can see these objectives using all button in my Dashboard. I have used macro for all the buttons. First I have made two slicers and after that I made all the buttons and assign macro to it. So the buttons are referencing to the slicers. When we click the All button then all the other buttons will be in green colour. Here green colour means that the button is on and yellow colour means the button is off. And we cannot turn off two year button at the same time. One button will be always on. By this we can see multiple combination of region wise and year wise.



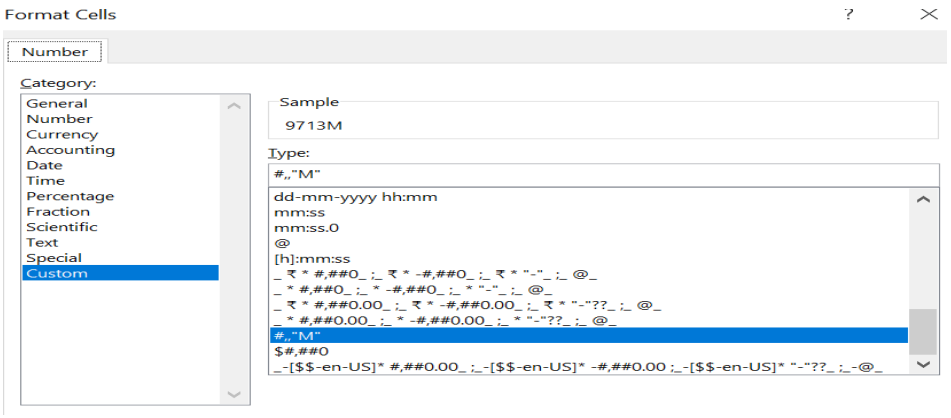
1. Display Region wise Distribution of Sales:

a) Introduction: The analysis shows the region wise total revenue of Sales.

b) Specific Requirements/Functions and Formulas:

i. Pivot table of region and total revenue.

ii. Show the total revenue in the pivot table as Million using number format.



iii. 3D Maps.

iv. Here we cannot make the 3D map direct from the pivot table. We have to make another table and we can take the references from the pivot table.

c) Analysis Results:

- We can see the total revenue region wise using 3D map.

- Here we find that Brazil has the highest revenue among other countries.

d) Visualisation:

Region	Sum of Total Revenue
Brazil	7990M
Canada	7606M
Egypt	4351M
India	7265M
Rusia	4126M
Grand Total	31338M

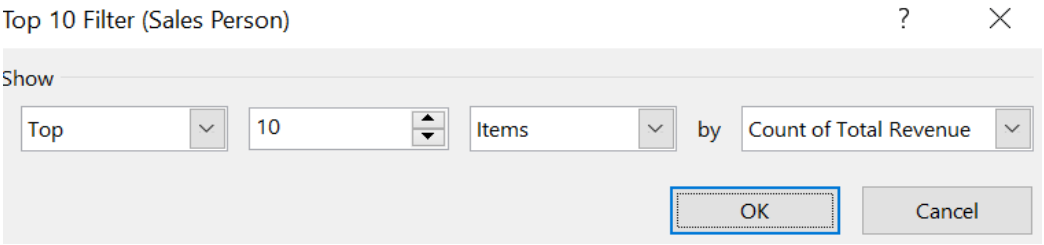
2. Display Tier Wise count of Sales of Top 10 Sales Person:

a) Introduction: The analysis shows the total count of Sales of Top 10 Person.

b) Specific Requirements/Functions and Formulas:

i. Pivot table of Row wise Sales Person and Column wise Tier Client and Count of total revenue.

ii. Here I use filter option to show top 10 sales man.



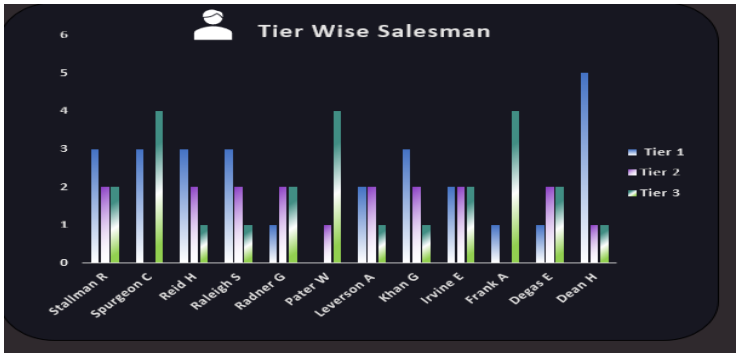
iii. Clustered Column Chart.

c)Analysis Results:

- We can see that Dean H is the top salesman in tier 1 and there are top 3 salesman in tier 3 and in tier 3 all salesman have same count of sales except 2 salesman.

d)Visualisation:

Count of Total Revenue	Column Labels			
Sales person	Tier 1	Tier 2	Tier 3	Grand Total
Stallman R	3	2	2	7
Spurgeon C	3		4	7
Rickover H	2	2	3	7
Livia S	4	3		7
Freund P	6	1		7
Fredrick B	2	3	4	9
Donn A	2		5	7
DeGeneres E	3	3	4	10
Dean J	5	1	4	10
Dean H	5	1	1	7
Dayan M	4	3	2	9
Grand Total	39	19	29	87



3. Display Top 5 Salesman Based on Total Revenue.

a) Introduction: The analysis shows top 5 Salesman Based on Total Revenue.

b) Specific Requirements/Functions and Formulas:

i. Pivot table of Row wise Sales Person and value wise total revenue.

ii. Here I use filter option to show top 5 sales man.

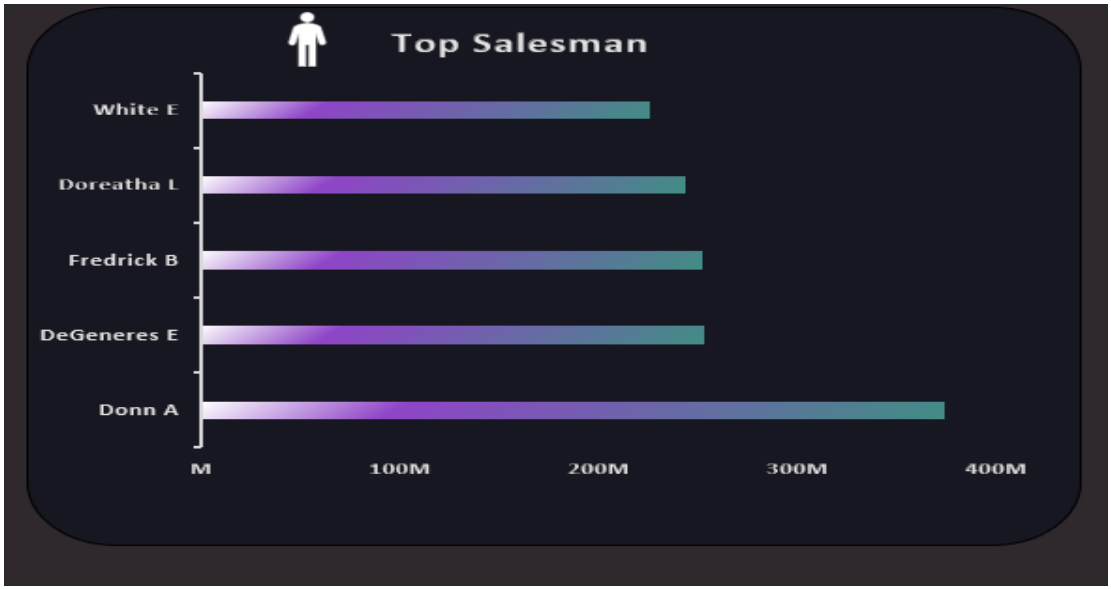
iii. Here I have also use sorting to show largest to smallest.

iv. Clustered Bar Chart.

c)Analysis Results:

- We can see that Donn A is the top salesman and White e has lowest revenue.

d)Visualisation:



Salesman	Sum of Total Revenue
Donn A	$37,39,08,150
DeGeneres E	$25,31,08,890
Fredrick B	$25,23,76,575
Doreatha L	$24,41,25,315
White E	$22,62,50,400
Grand Total	$1,34,97,69,330

4.Display Tier Wise top 5 Customers.

a) Introduction: The analysis shows the tier Wise top 5 Customers.

b) Specific Requirements/Functions and Formulas:

i. Pivot table of Row wise Sales Person and Column wise Tier Client and Count of total revenue.

ii. Here I use filter option to show top 5 sales man.

iii. 3-D Clustered Column Chart.

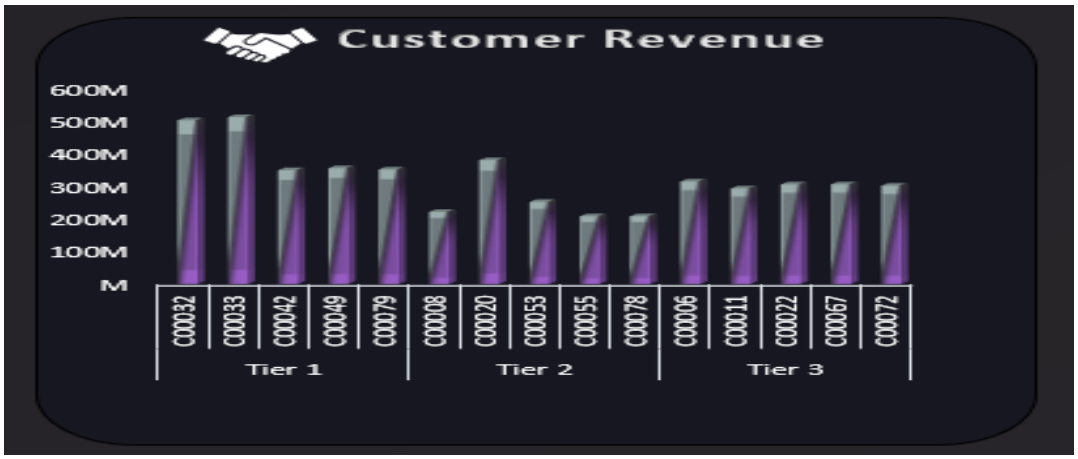
c)Analysis Results:

- We can see that C00033 is the top customer in tier 1 and C00020 is the top customer in tier 2 and that C0006 is the top customer in tier 3.

- Here we can also see that tier 1 customer has the highest revenue among all tier customers and C00055 and C000 tier 2 .

d)Visualisation:

Tier Wise Customer	Sum of Total Revenue
Tier 1	2057M
C00032	499M
C00033	509M
C00042	347M
C00049	353M
C00079	349M
Tier 2	1259M
C00008	220M
C00020	377M
C00053	250M
C00055	206M
C00078	206M
Tier 3	1510M
C00006	312M
C00011	291M
C00022	303M
C00067	304M
C00072	300M
Grand Total	4826M



5. Display Quarter Wise Total Revenue:

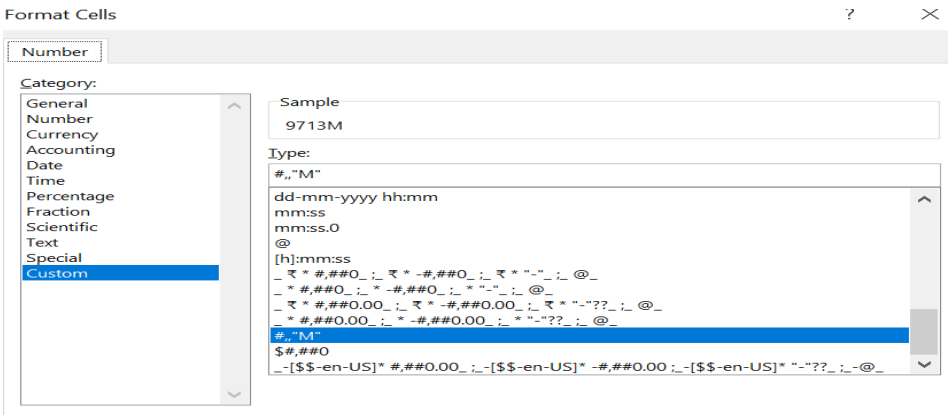
a) Introduction: The analysis shows the Quarter Wise Total Revenue .

b) Specific Requirements/Functions and Formulas:

i. Pivot table of Row wise Quarter and sum of total revenue quarter wise.

ii. Stacked Area for Visualization.

iii. Show the total revenue in the pivot table as Million using number format.



c)Analysis Results:

- We can see that from Q1 to Q2 revenue is increasing but after that it starts decreasing.
- Here we can also see that Q2 has the highest revenue among all quarters and Q3 has the lowest revenue.

d)Visualisation:

Quarter	Sum of Total Revenue
Q 2	8538M
Q 4	7803M
Q 3	7708M
Q 1	7288M
Grand Total	31338M

6. Display Profit Distribution Between Delivery Units:

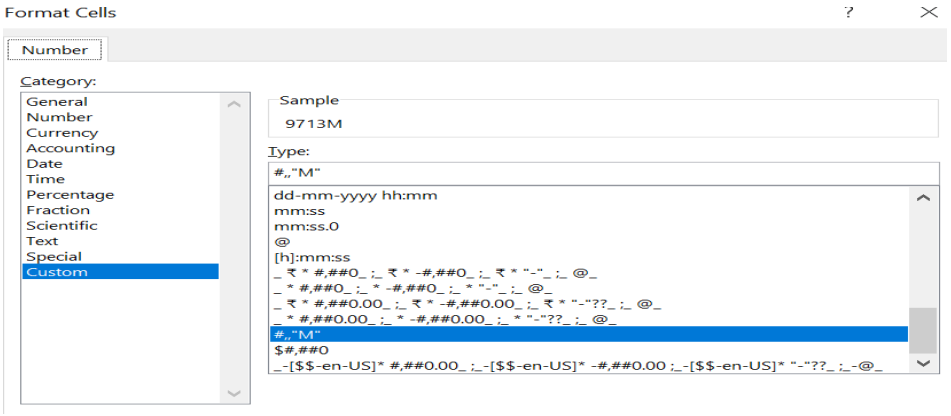
a) Introduction: The analysis shows the Profit Distribution Between Delivery Units.

b) Specific Requirements/Functions and Formulas:

i. Pivot table of Row wise Delivery Units and Sum of total profit.

ii. Here I have also use sorting to show largest to smallest.

iii. Show the total Profit in the pivot table as Million using number format.



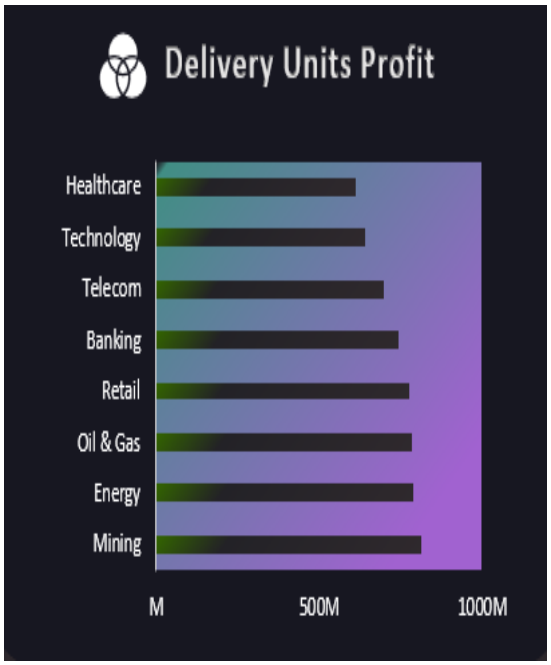
iv. Clustered Bar.

c)Analysis Results:

- We can see that the company earns highest profit from Mining sector and lowest profit from Healthcare sector .

d)Visualisation:

Delivery Units	Sum of Total Profit
Mining	815M
Energy	787M
Oil & Gas	784M
Retail	776M
Banking	743M
Telecom	697M
Technology	643M
Healthcare	613M
Grand Total	5857M



7.Display Top 5 Products based on Total Revenue :

a) Introduction: The analysis shows top 5 Products Based on Total Revenue.

b) Specific Requirements/Functions and Formulas:

I. Pivot table of Row wise Products and value wise total revenue.

II. Here I use filter option to show top 5 Products .

III. Pie Chart.

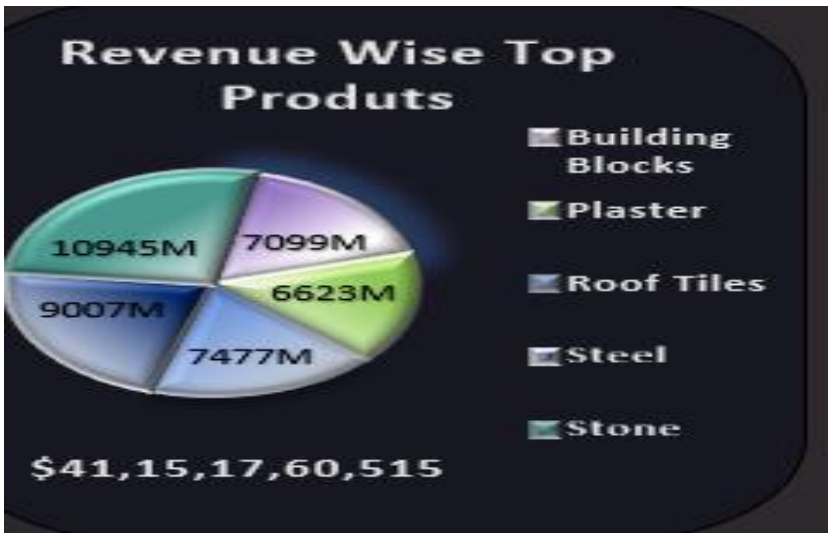
IV. Show the total Revenue in the pivot table as dollar and Million in the graph using number format.

V. I have used shadow in the pie chart.

c)Analysis Results:

- We can see stone has highest revenue and plaster has lowest revenue.

d)Visualisation:



Produts	Sum of Total Revenue
Building Blocks	$3,49,21,13,625
Plaster	$3,32,10,00,000
Roof Tiles	$3,89,93,55,450
Steel	$4,54,87,72,800
Stone	$5,38,36,21,500
Grand Total	$20,64,48,63,375

8.Display Top 5 Products based on Total Profit :

a) Introduction: The analysis shows top 5 Products Based on Total Profit.

b) Specific Requirements/Functions and Formulas:

I. Pivot table of Row wise Products and value wise total Profit.

II. Here I use filter option to show top 5 Products .

III. Doughnut Chart.

IV. Show the total Profit in the pivot table as using number format.

c)Analysis Results:

- We can see glass has highest profit and concrete admixtures has lowest profit.

d)Visualisation:

Products	Sum of Total Profit
Glass	$1,92,44,80,095
Roof Tiles	$1,85,42,70,105
Building Blocks	$1,37,63,77,500
Masonary Mater	$1,07,84,25,000
Concrete Admixtures	$1,00,51,42,140
Grand Total	$7,23,86,94,840

9.Display Monthwise Sales Trendline:

a) Introduction: The analysis shows the Monthwise Sales Trendline.

b) Specific Requirements/Functions and Formulas:

I. Pivot table of Row wise year , month and sum of total profit .

II. Stacked Line With Markers for Visualization.

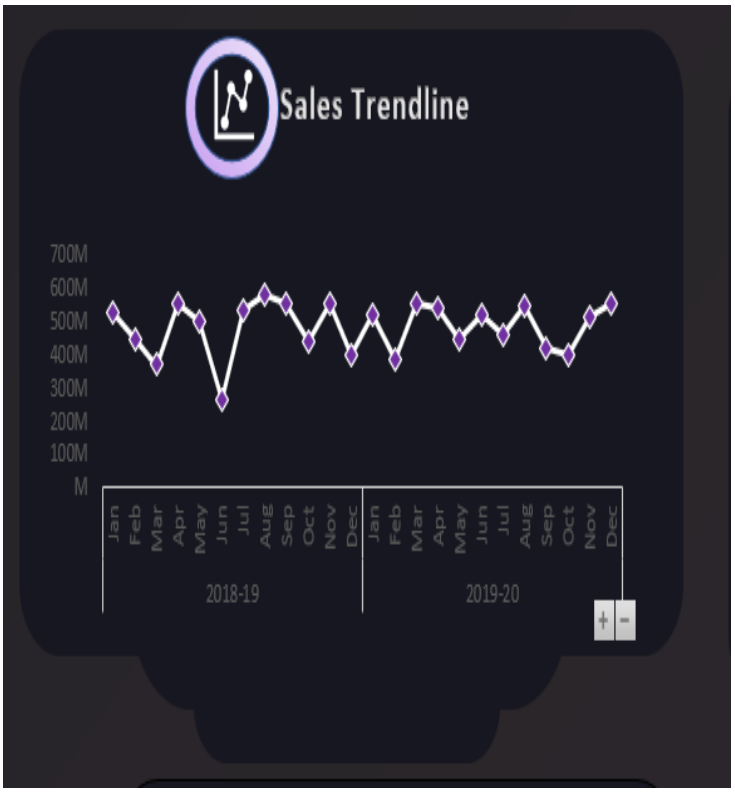
III. Show the total profit in the pivot table as Million using number format.

c)Analysis Results:

- We can see that 2019-20 has higher profit than 2018-19.
- Here we can also see that in 2018-19 August month has higher profit and June month has the lowest revenue and in 2019-20 December month has higher profit among all months and October month has the lowest revenue.

d)Visualisation:

Sales Trendline	Total Profit
2018-19	5710M
Jan	528M
Feb	447M
Mar	368M
Apr	552M
May	499M
Jun	265M
Jul	531M
Aug	580M
Sep	554M
Oct	440M
Nov	551M
Dec	396M
2019-20	5857M
Jan	518M
Feb	384M
Mar	555M
Apr	540M
May	444M
Jun	519M
Jul	461M
Aug	545M
Sep	422M
Oct	401M
Nov	513M
Dec	557M



10.Display Volume Wise Product Distribution:

a) Introduction: The analysis shows volume wise Product Distribution.

b) Specific Requirements/Functions and Formulas:

I. Pivot table of Row wise Products and value wise sum of volume.

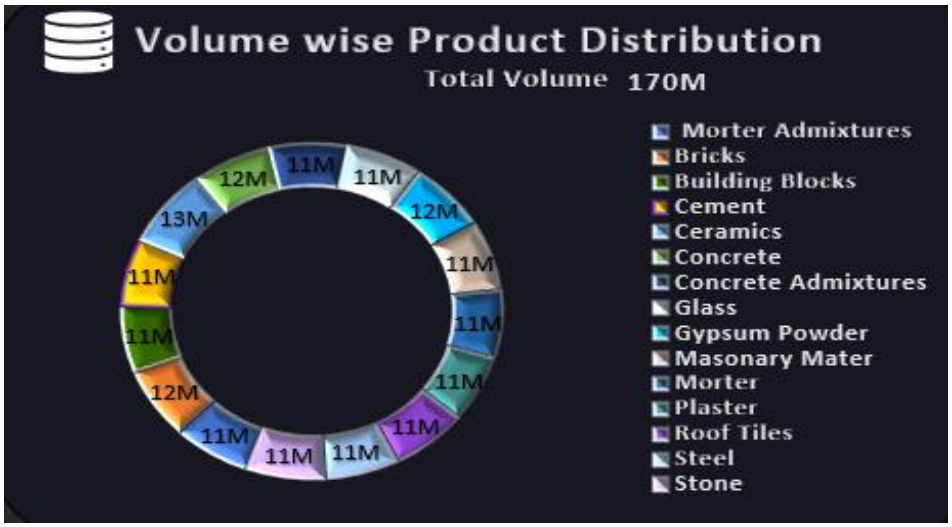
II. Doughnut Chart.

III. Show the total Volume in the pivot table as Million using number format.

c)Analysis Results:

- We can see Ceramics has highest volume among all products.
- We can see that total volume is 170 M.

d)Visualisation:



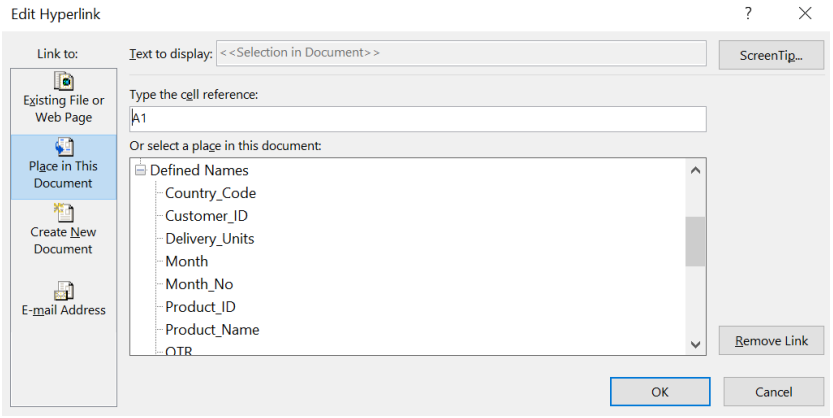
Products	Sum of Volume
Morter Admixtures	11M
Bricks	12M
Building Blocks	11M
Cement	11M
Ceramics	13M
Concrete	12M
Concrete Admixtures	11M
Glass	11M
Gypsum Powder	12M
Masonary Mater	11M
Morter	11M
Plaster	11M
Roof Tiles	11M
Steel	11M
Stone	11M
Grand Total	170M

List of Analysis with Results

- Through this dashboard We can see region wise total revenue using 3D map.
- Here we find that Brazil has the highest revenue among other countries.
- We find that Dean H is the top salesman in tier 1 and there are top 3 salesman in tier 3 and in tier 3 all salesman have same count of sales except 2 salesman.
- We find that Donn A is the top salesman with highest revenue and White e has lowest revenue.
- We find that C00033 is the top customer in tier 1 and C00020 is the top customer in tier 2 and that C0006 is the top customer in tier 3.
- We find that tier 1 customer has the highest revenue among all tier customers and C00055 and C0007 tier 2 .
- We find that from Q1 to Q2 revenue is increasing but after that it starts decreasing.
- We find that Q2 has the highest revenue among all quarters and Q3 has the lowest revenue.
- We find see that the company earns highest profit from Mining sector and lowest profit from Healthcare sector .
- We find see stone has highest revenue and plaster has lowest revenue.
- We find glass has highest profit and concrete admixtures has lowest profit
- We find that 2019-20 has higher profit than 2018-19.
- We find that in 2018-19 August month has higher profit and June month has the lowest revenue and in 2019-20 December month has higher profit among all months and October month has the lowest revenue.
- We find that Ceramics has highest volume among all products.
- We find that total volume is 170 M.

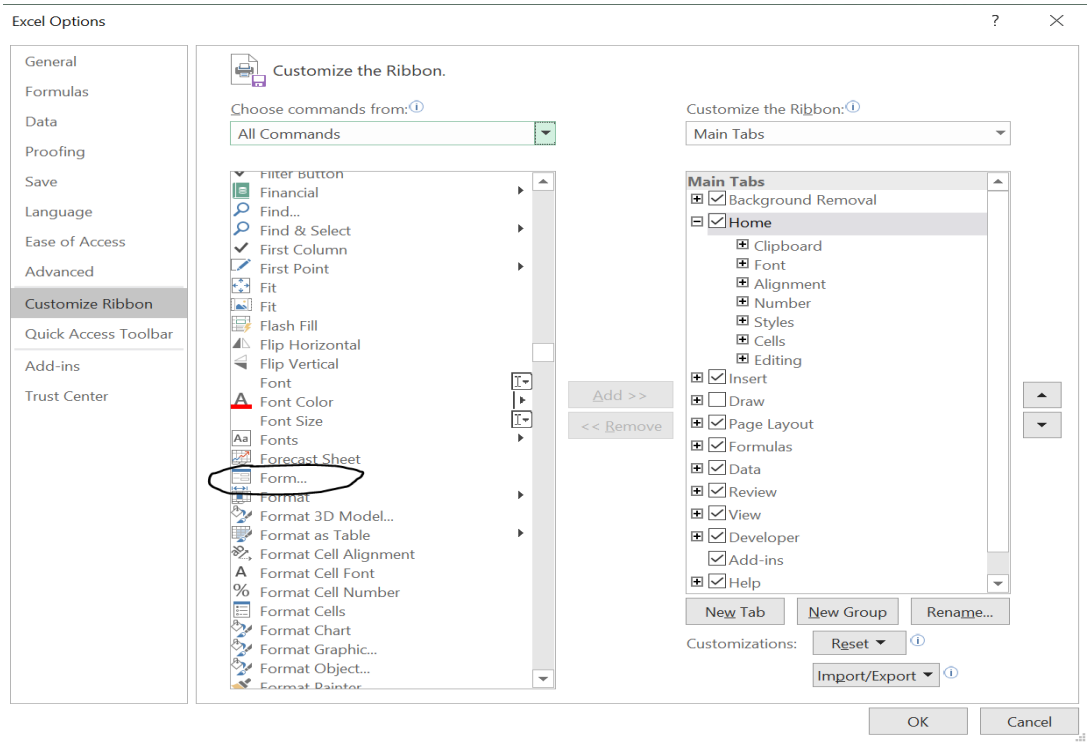
Dashboard Design

In this Sales And Operational Analytics Dashboard I have designed two specific dashboards. One is Executive Dashboard and another one is HR Dashboard. I have connect this two pages using link option.

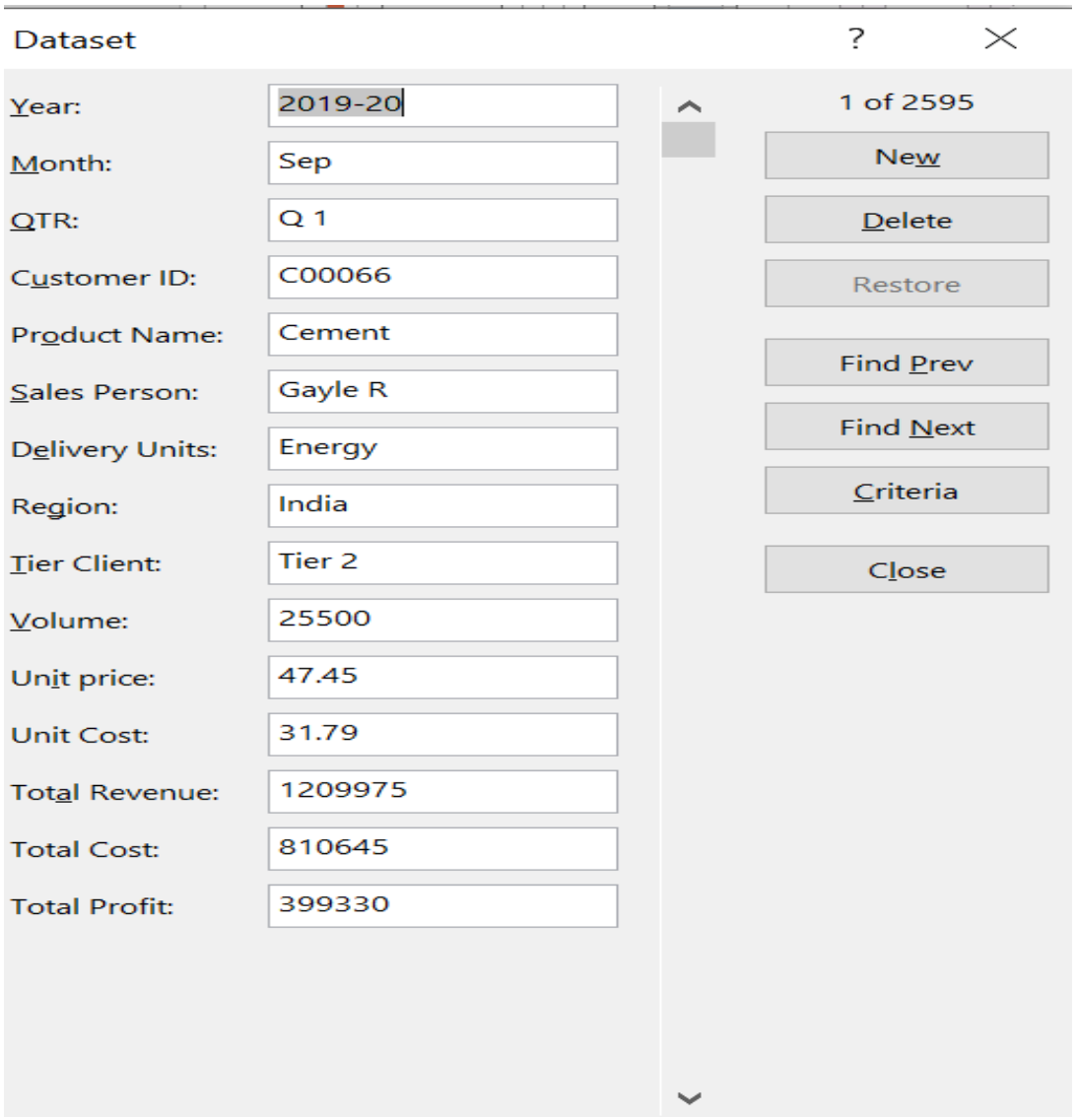


I have made slicers and buttons and different types of graphs in this dashboard.

I have also add a button named **Add New Data** when we click this button then a data entry form will be opened. In excel to create a form first we have to go to option field and then we have to select customized ribbon option and have to select all commands. Then a form will be created in excel.



We can perform different operation in this form like add, new etc. as mentioned in the image.



Dashboard Screenshots

Executive Dashboard:

HR_Dashboard:

Macro Code Screenshot:

```
Public y2019_20_var, y2018_19_var, Slicer_India_var, Slicer_Brazil_var, Slicer_Canada_var, Slicer_Egypt_var, Slicer_Rusia_var As Integer

Sub y2018_19()
'
' y2018_19 Macro
'

'

If y2018_19_var <> 1 Or y2019_20_var <> 1 Then

  With ActiveWorkbook.SlicerCaches("Slicer_Year")
      .SlicerItems("2018-19").Selected = True
    End With

    Sheets("Executive Dashboard").Shapes("Rectangle: Rounded Corners 76").Fill.ForeColor.RGB = vbGreen
    Sheets("HR Dashboard").Shapes("Rectangle: Rounded Corners 70").Fill.ForeColor.RGB = vbGreen

    y2018_19_var = 1

  Else
    With ActiveWorkbook.SlicerCaches("Slicer_Year")
        .SlicerItems("2018-19").Selected = False
    End With

    Sheets("Executive Dashboard").Shapes("Rectangle: Rounded Corners 76").Fill.ForeColor.RGB = vbYellow
    Sheets("HR Dashboard").Shapes("Rectangle: Rounded Corners 70").Fill.ForeColor.RGB = vbYellow
    y2018_19_var = 0

 End If

End Sub
Sub y2019_20()
'
' y2018_ Macro
'

'
 If y2018_19_var <> 1 Or y2019_20_var <> 1 Then

  With ActiveWorkbook.SlicerCaches("Slicer_Year")
      .SlicerItems("2019-20").Selected = True
    End With

    Sheets("Executive Dashboard").Shapes("Rectangle: Rounded Corners 77").Fill.ForeColor.RGB = vbGreen
    Sheets("HR Dashboard").Shapes("Rectangle: Rounded Corners 72").Fill.ForeColor.RGB = vbGreen
    y2019_20_var = 1

  Else
    With ActiveWorkbook.SlicerCaches("Slicer_Year")
        .SlicerItems("2019-20").Selected = False
    End With

    Sheets("Executive Dashboard").Shapes("Rectangle: Rounded Corners 77").Fill.ForeColor.RGB = vbYellow
    Sheets("HR Dashboard").Shapes("Rectangle: Rounded Corners 72").Fill.ForeColor.RGB = vbYellow
    y2019_20_var = 0

 End If
```

```
Sub All()
'
' y2018_ Macro
'

'
    With ActiveWorkbook.SlicerCaches("Slicer_Year")
    .ClearAllFilters
        .SlicerItems("2018-19").Selected = True
        .SlicerItems("2019-20").Selected = True
    End With

    With ActiveWorkbook.SlicerCaches("Slicer_Region1")
    .ClearAllFilters
        .SlicerItems("India").Selected = True
        .SlicerItems("Brazil").Selected = True
        .SlicerItems("Canada").Selected = True
        .SlicerItems("Egypt").Selected = True
        .SlicerItems("Rusia").Selected = True

    End With

    Sheets("Executive Dashboard").Shapes("Rectangle: Rounded Corners 77").Fill.ForeColor.RGB = vbGreen
    Sheets("Executive Dashboard").Shapes("Rectangle: Rounded Corners 76").Fill.ForeColor.RGB = vbGreen
    Sheets("HR Dashboard").Shapes("Rectangle: Rounded Corners 70").Fill.ForeColor.RGB = vbGreen
    Sheets("HR Dashboard").Shapes("Rectangle: Rounded Corners 72").Fill.ForeColor.RGB = vbGreen
    Sheets("Executive Dashboard").Shapes("Rectangle: Rounded Corners 102").Fill.ForeColor.RGB = vbGreen
    Sheets("HR Dashboard").Shapes("Rectangle: Rounded Corners 63").Fill.ForeColor.RGB = vbGreen
    Sheets("Executive Dashboard").Shapes("Rectangle: Rounded Corners 62").Fill.ForeColor.RGB = vbGreen
    Sheets("HR Dashboard").Shapes("Rectangle: Rounded Corners 49").Fill.ForeColor.RGB = vbGreen
    Sheets("Executive Dashboard").Shapes("Rectangle: Rounded Corners 98").Fill.ForeColor.RGB = vbGreen
    Sheets("HR Dashboard").Shapes("Rectangle: Rounded Corners 61").Fill.ForeColor.RGB = vbGreen
    Sheets("Executive Dashboard").Shapes("Rectangle: Rounded Corners 101").Fill.ForeColor.RGB = vbGreen
    Sheets("HR Dashboard").Shapes("Rectangle: Rounded Corners 62").Fill.ForeColor.RGB = vbGreen
    Sheets("Executive Dashboard").Shapes("Rectangle: Rounded Corners 103").Fill.ForeColor.RGB = vbGreen
    Sheets("HR Dashboard").Shapes("Rectangle: Rounded Corners 64").Fill.ForeColor.RGB = vbGreen
    y2018_19_var = 1
    y2019_20_var = 1
    Slicer_India_var = 1
    Slicer_Brazil_var = 1
    Slicer_Canada_var = 1
    Slicer_Egypt_var = 1
    Slicer_Rusia_var = 1


End Sub

Sub Slicer_India()
'
' Slicer_India Macro
'

If Slicer_India_var <> 1 Then

    With ActiveWorkbook.SlicerCaches("Slicer_Region1")

        .SlicerItems("India").Selected = True


End Sub
Sub Slicer_Egypt()
'
' Slicer_India Macro
'

If Slicer_Egypt_var <> 1 Then

    With ActiveWorkbook.SlicerCaches("Slicer_Region1")

        .SlicerItems("Egypt").Selected = True

     End With
     Sheets("Executive Dashboard").Shapes("Rectangle: Rounded Corners 101").Fill.ForeColor.RGB = vbGreen
     Sheets("HR Dashboard").Shapes("Rectangle: Rounded Corners 62").Fill.ForeColor.RGB = vbGreen
     Slicer_Egypt_var = 1
    Else
     With ActiveWorkbook.SlicerCaches("Slicer_Region1")
        .SlicerItems("Egypt").Selected = False

     End With

    Sheets("Executive Dashboard").Shapes("Rectangle: Rounded Corners 101").Fill.ForeColor.RGB = vbYellow
    Sheets("HR Dashboard").Shapes("Rectangle: Rounded Corners 62").Fill.ForeColor.RGB = vbYellow
    Slicer_Egypt_var = 0

End If

End Sub

Sub Slicer_Rusia()
'
' Slicer_India Macro
'

If Slicer_Rusia_var <> 1 Then

    With ActiveWorkbook.SlicerCaches("Slicer_Region1")

        .SlicerItems("Rusia").Selected = True

     End With
     Sheets("Executive Dashboard").Shapes("Rectangle: Rounded Corners 103").Fill.ForeColor.RGB = vbGreen
     Sheets("HR Dashboard").Shapes("Rectangle: Rounded Corners 64").Fill.ForeColor.RGB = vbGreen
     Slicer_Rusia_var = 1
    Else
     With ActiveWorkbook.SlicerCaches("Slicer_Region1")
        .SlicerItems("Rusia").Selected = False

     End With

    Sheets("Executive Dashboard").Shapes("Rectangle: Rounded Corners 103").Fill.ForeColor.RGB = vbYellow
    Sheets("HR Dashboard").Shapes("Rectangle: Rounded Corners 64").Fill.ForeColor.RGB = vbYellow
    Slicer_Rusia_var = 0

End If

End Sub
```

```
Sub Slicer_Brazil()
'
' Slicer_India Macro
'

If Slicer_Brazil_var <> 1 Then

    With ActiveWorkbook.SlicerCaches("Slicer_Region1")
    .ClearAllFilters
        .SlicerItems("Brazil").Selected = True

     End With
      Sheets("Executive Dashboard").Shapes("Rectangle: Rounded Corners 62").Fill.ForeColor.RGB = vbGreen
      Sheets("HR Dashboard").Shapes("Rectangle: Rounded Corners 49").Fill.ForeColor.RGB = vbGreen
     Slicer_Brazil_var = 1
    Else
     With ActiveWorkbook.SlicerCaches("Slicer_Region1")
        .SlicerItems("Brazil").Selected = False
     End With

    Sheets("Executive Dashboard").Shapes("Rectangle: Rounded Corners 62").Fill.ForeColor.RGB = vbYellow
    Sheets("HR Dashboard").Shapes("Rectangle: Rounded Corners 49").Fill.ForeColor.RGB = vbYellow
    Slicer_Brazil_var = 0

End If

End Sub
```

```
Sub Slicer_Canada()
'
' Slicer_India Macro
'


   If Slicer_Canada_var <> 1 Then

    With ActiveWorkbook.SlicerCaches("Slicer_Region1")
        .SlicerItems("Canada").Selected = True

     End With
     Sheets("Executive Dashboard").Shapes("Rectangle: Rounded Corners 98").Fill.ForeColor.RGB = vbGreen
     Sheets("HR Dashboard").Shapes("Rectangle: Rounded Corners 61").Fill.ForeColor.RGB = vbGreen
     Slicer_Canada_var = 1
    Else
     With ActiveWorkbook.SlicerCaches("Slicer_Region1")
        .SlicerItems("Canada").Selected = False

     End With

    Sheets("Executive Dashboard").Shapes("Rectangle: Rounded Corners 98").Fill.ForeColor.RGB = vbYellow
    Sheets("HR Dashboard").Shapes("Rectangle: Rounded Corners 61").Fill.ForeColor.RGB = vbYellow
    Slicer_Canada_var = 0

End If

End Sub
```

References

1. Microsoft Excel 2016 Bible: The Comprehensive Tutorial Resource by John Walkenbach, Wiley
2. Fundamentals of Business Analytics by R.N. Prasad, Seema Acharya, Wiley

Bibliography

- https://www.kaggle.com
- https://www.youtube.com
- www.google.com
- https://www.stackoverflow.com
- https://nl.devoteam.com/expert-view/the-role-of-data-analytics-in-the-sales-and-operational-planning/
- https://blog.hubspot.com/sales/essential-sales-reports-for-sales-leaders
- https://blog.getcensus.com/what-is-operational-analytics/
- https://www.logianalytics.com/resources/bi-encyclopedia/operational-reporting/
- https://www.datapine.com/blog/strategic-operational-reporting/