



Call Center Performance Analysis

Real World Fake Call Center Dataset - Excel Project

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Introduction

The "Real World Fake Data - Call Centers" dataset offers a simulated snapshot of call center operations, comprising 34,942 rows and 12 distinct features. This dataset provides a comprehensive simulated view of call center operations, capturing various customer interactions and performance metrics. This report outlines the systematic approach taken to analyze and interpret the data using Excel, with the primary aim of refining and enhancing Excel-based data manipulation and visualization skills. Through these exercises, the dataset was transformed into a well-structured and insightful resource, enabling deeper exploration of customer sentiment, call center efficiency, and other critical metrics. The objective was not only to extract meaningful patterns and trends but also to develop a robust skill set in handling complex datasets using Excel's powerful features.

- **Data Cleaning and Preparation:** The analysis journey began with an extensive data cleaning and preparation phase. Various advanced Excel techniques were employed to ensure data accuracy and consistency.
- **Advanced Formulas and Functions:** A range of advanced formulas and functions were utilized to extract deeper insights from the data.
- **Data Analysis and Reporting:** The data analysis phase involved the creation of pivot tables and pivot charts to summarize and visualize the data dynamically.
- **Data Visualization:** To present the insights in a visually appealing and accessible manner, various charts, and graphs.

A	B	C	D	E	F	G	H	I	J	K	L	M
id	customer_name	sentiment	csat_score	call_timestamp	reason	city	state	channel	response_time	call_duration	in_call_center	
2 DKK-57076809-w-055481-fU	Analise Gairdner	Neutral	7	10/29/2020	Billing Question	Detroit	Michigan	Call-Center	Within SLA	17	Los Angeles/CA	
3 QGK-72219678-w-102139-KY	Crichton Kidsley	Very Positive		10/05/2020	Service Outage	Spartanburg	South Carolina	Chatbot	Within SLA	23	Baltimore/MD	
4 GYJ-30025932-A-023015-LD	Averill Brundrett	Negative		10/04/2020	Billing Question	Gainesville	Florida	Call-Center	Above SLA	45	Los Angeles/CA	
5 ZJI-96807559-i-620008-m7	Noreen Lafflina	Very Negative	1	10/17/2020	Billing Question	Portland	Oregon	Chatbot	Within SLA	12	Los Angeles/CA	
6 DDU-69451719-O-176482-Fm	Toma Van der Beken	Very Positive		10/17/2020	Payments	Fort Wayne	Indiana	Call-Center	Within SLA	23	Los Angeles/CA	
7 JVI-79728660-U-224285-4a	Kaylyn Emlen	Neutral	5	10/28/2020	Billing Question	Salt Lake City	Utah	Call-Center	Within SLA	25	Baltimore/MD	

1. Data Cleaning and Preparation

- **Change Column Names with Capitalized First Letters**



To enhance readability and maintain consistency, all column names were updated by capitalizing the first letter of each word. This standardization ensures that the dataset is easier to navigate and analyze.

	A	B	C	D	E	F		
	Call_Center	Customer_ID	Customer_Name	Sentiment	Customer_Sat_Score	Call_Timestamp	#	Date_of_the_Month
1		DKK-57076809-w-055481-fU	Analise Gairdner	Neutral	7	10/01/2020		29
2		QGK-72219678-w-102139-KY	Crichton Kidsley	Very Positive		10/01/2020		5
3		GYJ-30025932-A-023015-LD	Averill Brundrett	Negative		10/01/2020		4
4		ZJI-96807559-i-620008-m7	Noreen Lafflina	Very Negative	1	10/01/2020		17

- Change Data Types for Specific Columns**

The data types for the Cust_SatScore and Call_Duration_in_Minutes columns were converted to numeric formats. This change was essential for enabling accurate calculations and analysis, respectively.

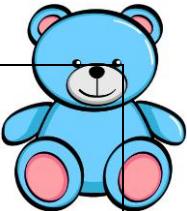
#	Customer_Sat_Score	Call_Timestamp	#	Date_of_the_Month	Reason	City	#	State	Channel	Response_Time	#	Call_Duration_in_Minutes
	7	10/01/2020		29	Billing Question	Detroit		Michigan	Call-Center	Within SLA		17
		10/01/2020		5	Service Outage	Spartanburg		South Carolina	Chatbot	Within SLA		23
		10/01/2020		4	Billing Question	Gainesville		Florida	Call-Center	Above SLA		45
		1	10/01/2020	17	Billing Question	Portland		Oregon	Chatbot	Within SLA		12
		10/01/2020		17	Payments	Fort Wayne		Indiana	Call-Center	Within SLA		23

- Extract Date from Call_Timestamp and Create a New Column**

A new column, Date_of_the_Month, was created by extracting the date from the Call_Timestamp column. This transformation allows for more granular analysis of call patterns by specific dates, making it easier to identify trends over time.

- Change Data Format to Table Format**

The entire dataset was converted into an Excel Table, named "Call Center Table." Using the table format improves data management, as it allows for easy sorting, filtering, and analysis while also maintaining the dataset's structure during updates.



- **Separate Location from Call_Center Column and Create a New Column**

Extracted location from Call_Center column, and named as Province_Abbr for more accurate categorization and analyzation data by geographic location, enabling region-specific insights.

State	Channel	Response_Time	#	Call_Duration_in_Minutes	Call_Center	Province_Abbr
Michigan	Call-Center	Within SLA		17	Los Angeles	CA
South Carolina	Chatbot	Within SLA		23	Baltimore	MD
Florida	Call-Center	Above SLA		45	Los Angeles	CA
Oregon	Chatbot	Within SLA		12	Los Angeles	CA
Indiana	Call-Center	Within SLA		23	Los Angeles	CA

- **Check for Duplicates Using Customer_ID**

A thorough check for duplicate records was conducted using the Customer_ID column. Removing duplicates is crucial to ensure the integrity of the dataset and to avoid skewed analysis results caused by redundant data entries.

- **Check for Missing Values**

The dataset was scanned for missing values across all columns. Identifying and addressing missing data is a critical step in maintaining data quality, as it prevents inaccuracies in analysis and ensures that the findings are based on complete information.

2. Advanced Formulas and Functions

2.1 Lookup Functions

2.1.1 VLOOKUP Function

- ✓ VLOOKUP function was used to retrieve the Customer Satisfaction Score based on the Customer Name.
- ✓ If the lookup value does not exist or if the corresponding data is missing, VLOOKUP will either return an empty cell or an error like #N/A, depending on how the data is structured.



- ✓ The VLOOKUP function in Excel searches for a value in the leftmost column of a specified range and then returns a value from a specified column to the right of the lookup column.

Lookup Functions	
VLOOKUP Function	
Customer Name	Satisfaction Score
Taddeusz Badcock	6
Ellyn McCaskill	10
Vale Bouette	# function returns empty cell since Vale Boutte does not have satisfaction score
Amargo Eplate	8
Carola Gummery	8
Faina Matyasik	6
Doloritas enzley	3

2.1.2 XLOOKUP Function

- ✓ Unlike VLOOKUP, XLOOKUP can search both horizontally and vertically, and it can look up data both to the left and to the right of the lookup value. It also provides better handling of missing data.
- ✓ The Customer Name in column B (Customer_Names) and retrieves the corresponding Satisfaction Score from column D (Satisfaction_Scores). If the Satisfaction Score is not found, it returns 0 instead of leaving the cell empty or returning an error.

Key Advantages of XLOOKUP:

- **Flexibility in Search Direction:** It can search both to the left and to the right, making it more versatile than VLOOKUP.
- **Handling Missing Data:** If_not_found argument in XLOOKUP provides a way to handle cases where the lookup value doesn't exist, returning a specified default value instead of an error.
- **Improved Match Options:** Exact match, approximate match, and more, giving greater control over how lookups are performed.



A	B	C	D
XLOOKUP Function			
Customer Name	Satisfaction Score		
Taddeusz Badcock	? =XLOOKUP(A17,'Call Center'!\$B\$2:\$B\$32942,'Call Center'!\$D\$2:\$D\$32942,0)	10	
Ellyn McCaskill	0		
Vale Bouette	0		
Amargo Eplate	8		
Carola Gummery	8		

2.1.3 INDEX and MATCH

The INDEX function returns the value of a cell in a specified row and column within a given range. The MATCH function, on the other hand, returns the relative position of a lookup value in a range. When combined, these functions can look up values in a more flexible and powerful way than VLOOKUP or HLOOKUP.

A	B	C	D
Customer Name			
Customer ID			
Mala Poulett	CYD-61676741-2-485507-Dm		
Goddart Norker	JSZ-33185256-z756220-IK		
Winfred Gluyus	ZII-18507316-k-632715-1z		
Bobbi Druett	DTD-40530750-O-191804-ay		
Sascha McLafferty	ROA-29689856-t-493976-Zf		

Advantages of INDEX MATCH:

- Flexibility:** Unlike VLOOKUP, INDEX MATCH doesn't require the lookup value to be in the first column. It can search both left-to-right and right-to-left, making it more versatile.



- Performance:** In large datasets, it can be faster and more efficient than VLOOKUP.
- No Need for Column Order:** Can use them to look up data even if the lookup value and return value are not adjacent or in a specific order.

2.2 Dynamic Arrays and Functions

2.2.1 Filter Function with Data Validation

The FILTER function allows to filter a range of data based on criteria. When combined with Data Validation, it provides a powerful tool for creating interactive and user-friendly spreadsheets where users can select specific values from a dropdown list, and the data dynamically updates based on that selection.

Dynamic Arrays and Functions

Filter Function with Data Validation

Select the Customer Name	Phillipe Bowring	Customer_Name	Sentiment	Satisfaction_score	Date	Date_of_the_Month	Reason	City	State
	Phillipe Bowring	Phillipe Bowring	Neutral	8	10/01/2020	16	Billing Question	Tyler	Texas
	Krysta de Tocqueville								
	Oran Lifsey								
	Port Ingall								
	Ella Cristoforo								
	Aubrey Surcombe								
	Nicole Fareweather								
	Melesa Ricardot								
	Odell Catherseyd								
	Dani Stanfield								

Sort the Result Set of I

Select the State

Select the Channel

+ Call Ce

Pivot Table 1 Dashboard

```
=filter(Call_Center,Call_Center[Customer_Name]=B36)
```

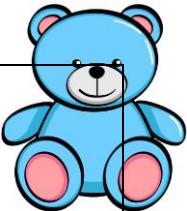
Dynamic Arrays and Functions

Filter Function with Data Validation

Select the Customer Name	Phillipe Bowring	Customer_ID	Customer_Name	Sentiment	Satisfaction_score	Date	Date_of_the_Month	Reason	City	State
	AZI-95054097-e-185542-PT	Phillipe Bowring	Phillipe Bowring	Neutral	8	10/01/2020	16	Billing Question	Tyler	Texas

Advantages of Using the FILTER Function with Data Validation:

- Dynamic Updates:** The data displayed updates dynamically based on the selection, making it easier to focus on relevant information.



- **Efficiency:** This approach eliminates the need for manually filtering data, saving time, and reducing errors.

2.2.2 Sort the Result Set of FILTER Function with Multiple Conditions

A	B	C	D	E	F	G	H	I
<code>=fx =sort(choosecols(filter(Call_Center,(Call_Center[State]=B42)*(Call_Center[Channel]=B43)*(Call_Center[Call_Timestamp]=E42)),1,2,5,7,8,11,13),3,1)</code>								
Sort the Result Set of Filter Function with Multiple Condition								
Select the State	Tennessee	Date	10/4/2020					
Select the Channel	Chatbot							
Customer_ID	Customer_Name	Date		Reason	City	Response_Time	Call Center	
BUI-84201565-S-568319-HM	Corella de Banke	10/04/2020		Billing Question	Knoxville	Above SLA	Los Angeles	
DLF-37597034-1-532790-ev	Nolly Merit	10/04/2020		Billing Question	Memphis	Below SLA	Los Angeles	
IUH-43215865-G-516707-gh	Kristo Marsie	10/04/2020		Service Outage	Chattanooga	Below SLA	Los Angeles	
DAO-89116207-a-716756-vp	Jacquette Meacher	10/04/2020		Service Outage	Chattanooga	Within SLA	Chicago	
WDQ-26640569-A-377070-32	Kettie Domerq	10/04/2020		Billing Question	Knoxville	Within SLA	Baltimore	
RFT-62901197-w-612612-GB	Jacob Gebbe	10/04/2020		Service Outage	Memphis	Within SLA	Chicago	

The FILTER function can be combined with other functions, such as SORT, to create a more refined and ordered dataset. When multiple conditions are applied to the FILTER function, it returns only the rows that meet all the specified criteria. Adding the SORT function to this combination allows you to display the results in a specific order.

Sort the Result Set of Filter Function with Multiple Condition								
Select the State	Tennessee	Date	10/6/2020					
Select the Channel	Email							
Customer_ID	Customer_Name	Date		Reason	City	Response_Time	Call Center	
PRL-3673710-z-060888-Sp	Elvis Szantho	10/06/2020		Billing Question	Nashville	Within SLA	Los Angeles	
NRX-90119651-u-465689-a9	Shoshana Hryniwicki	10/06/2020		Billing Question	Knoxville	Within SLA	Baltimore	
TUD-81102995-N-912557-R2	Benson Wipermann	10/06/2020		Service Outage	Memphis	Within SLA	Los Angeles	
HQX-22002966-x-668231-oh	Marcel Hayworth	10/06/2020		Billing Question	Nashville	Within SLA	Los Angeles	
DZA-68938022-M-539877-dH	Leodora Yearsley	10/06/2020		Billing Question	Memphis	Above SLA	Los Angeles	
MKQ-59504432-Y-901908-5m	Rosette Smewings	10/06/2020		Billing Question	Knoxville	Within SLA	Los Angeles	
FIG-46892733-4-934407-cx	Lavina Gai	10/06/2020		Billing Question	Knoxville	Within SLA	Chicago	

2.2.3 Sequence function.

The SEQUENCE function in Excel is a dynamic array function that generates a list of sequential numbers in a range of cells. It's useful for creating ordered lists, numbering rows, or generating indices automatically.



fx =SEQUENCE(counta(B56:B65))

A	B
Sequence function	
Sequence	State
1	South Carolina
2	Florida
3	Oregon
4	Indiana
5	Utah
6	Texas
7	New York
8	Texas
9	Ohio
10	Washington

The SEQUENCE and COUNTA functions generate a sequence of numbers that corresponds to the number of non-empty cells in a specified range.

2.3 Logical Functions

2.3.1 Nested IF Function

The Nested IF function tests multiple conditions within a single formula. Nested IF statement combined with the AND function to evaluate multiple conditions and return different outputs based on those conditions.

fx =if(and(B72<6,C72>20,), "Review", if(B72>8, "Good Performance", "Should Improve"))

A	B	C	D
Logical Functions			
1. Nested IF Function			
Customer_Sentiment	Customer_Satisfaction_Score	Duration of Calls	Remark
Neutral	8	17	Should Improve
Negative	6	27	Should Improve
Very Negative	3	37	Review
Positive	7	11	Should Improve
Neutral	6	35	Should Improve



Logical Functions

1. Nested IF Function

Customer_Sentiment	Customer_Satisfaction_Score	Duration of Calls	Remark
Neutral	8	17	Should Improve
Negative	6	27	Should Improve
Very Negative	3	37	Review
Positive	7	11	Should Improve
Neutral	6	35	Should Improve
Negative	4	38	Review
Neutral	6	43	Should Improve
Neutral	7	11	Should Improve
Neutral	5	32	Review
Very Positive	9	20	Good Performance

2.3.2 IFS Function with Conditional Formating

The IFS function in Excel is used to evaluate multiple conditions, and it returns a value corresponding to the first condition that evaluates to TRUE.

A	B	C	D	E
2. IFS Function with Conditional Formating				
Customer_Sentiment	Customer_Satisfaction_Score	Duration of Calls	Remark	
Neutral	8	17	Should Improve 😊	
Negative	6	27	Should Improve 😊	
Very Negative	3	37	Review 😊	
Positive	7	11	Should Improve 😊	
Neutral	6	35	Should Improve 😊	
Negative	4	38	Review 😊	
Neutral	6	43	Should Improve 😊	
Neutral	7	11	Should Improve 😊	
Neutral	5	32	Review 😊	
Very Positive	9	20	Good Performance ❤️	

How it Works:

- ✓ The IFS function checks each condition in order: First, it checks if the satisfaction score is less than 6 and the call duration is greater than 20 minutes.



- ✓ If the first condition is not met, it checks if the satisfaction score is greater than 8.
- ✓ If neither condition 1 nor condition 2 is met, it defaults to the catch-all condition, which will return "Should Improve 😊".

2.4 Text/ String Functions

2.4.1 Text Join Function with Char()

The TEXTJOIN function in Excel is used to concatenate (or join) multiple text strings into one, with an optional delimiter between them. In this formula, CHAR(10) is used as the delimiter, which inserts a line break between the joined text values.

Text/ String Functions				
1. Text Join Function with Char()				
Customer Name	City	State	Call Center Location	
Analise Gairdner	Detroit	Michigan	Los Angeles	Analise Gairdner Detroit Michigan Los Angeles
Crichton Kidsley	Spartanburg	South Carolina	Baltimore	Crichton Kidsley Spartanburg South Carolina Baltimore
Averill Brundrett	Gainesville	Florida	Los Angeles	Averill Brundrett Gainesville Florida Los Angeles
Noreen Lafflina	Portland	Oregon	Los Angeles	Noreen Lafflina Portland Oregon Los Angeles
Toma Van der Beken	Fort Wayne	Indiana	Los Angeles	Toma Van der Beken Fort Wayne Indiana Los Angeles

2.4.2 Text Function

A	B	C	D	E	F	G	H	I
2. Text Function								
Customer Name	City	State	Call Center Location	Province Abbr	Text Function Result			
Analise Gairdner	Detroit	Michigan	Los Angeles	CA	Analise Gairdner,Detroit,Michigan,Los Angeles,CA			
Crichton Kidsley	Spartanburg	South Carolina	Baltimore	MD	Crichton Kidsley,Spartanburg,South Carolina,Baltimore,MD			
Averill Brundrett	Gainesville	Florida	Los Angeles	CA	Averill Brundrett,Gainesville,Florida,Los Angeles,CA			
Noreen Lafflina	Portland	Oregon	Los Angeles	CA	Noreen Lafflina,Portland,Oregon,Los Angeles,CA			
Toma Van der Beken	Fort Wayne	Indiana	Los Angeles	CA	Toma Van der Beken,Fort Wayne,Indiana,Los Angeles,CA			



The TEXTJOIN function in Excel is used to concatenate (or join) multiple text strings into one, with an optional delimiter between them. In this formula, the delimiter ‘,’ is inserts a line break between the joined text values.

2.4.3 LEFT, RIGHT & MID Function

- ✓ The LEFT, RIGHT, and MID functions in Excel are used to extract specific portions of a text string.
- ✓ LEFT Function extracts characters from the start of the text string. RIGHT Function extracts characters from the end of the text string. MID Function extracts characters from the middle of the text string, starting at a specific position.

3. LEFT, RIGHT & MID Function				
Customer_ID	LEFT Function	RIGHT Function	MID Function	
JVI-79728660-U-224285-4a	JVI	4a	79728660	
AZI-95054097-e-185542-PT	AZI	PT	95054097	
TWX-27007918-I-608789-Xw	TWX	Xw	27007918	
XNG-44599118-P-344473-ZU	XNG	ZU	44599118	
RLC-64108207-Z-285141-VS	RLC	VS	64108207	

2.4.4 Len Function

The LEN function in Excel is used to determine the number of characters in a text string. This includes all characters, such as letters, numbers, punctuation, and spaces.

A	B	C
4. Len Function		
Customer_ID	LENGTH	
JVI-79728660-U-224285-4a	24	
AZI-95054097-e-185542-PT	24	
TWX-27007918-I-608789-Xw	24	
XNG-44599118-P-344473-ZU	24	
RLC-64108207-Z-285141-VS	24	

2.4.5 Proper Function



The PROPER function in Excel is used to capitalize the first letter of each word in a text string, while converting all other letters to lowercase. This is often used to format names or titles correctly.

A	B	C
5. Proper Function		
Customer_Name	UPPER Function	Proper Function
Giustino Kennermann	GIUSTINO KENNERMANN	Giustino Kennermann
Glori Oleksiak	GLORI OLEKSIAK	Glori Oleksiak
Rey Sabatini	REY SABATINI	Rey Sabatini
Brandyn Venneur	BRANDYN VENNEUR	Brandyn Venneur
Pierce Gallichan	PIERCE GALLICHAN	Pierce Gallichan

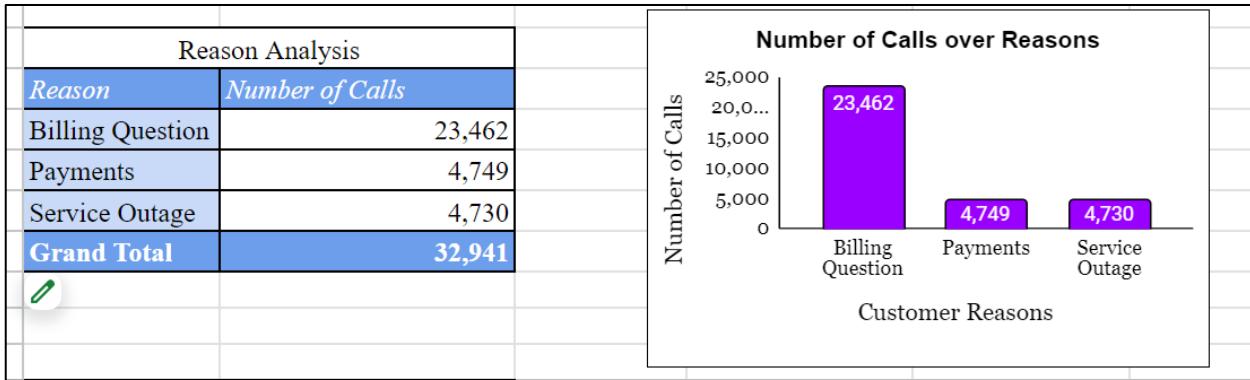
3. Data Analysis and Reporting

Pivot Tables and Pivot Charts:

3.1 Reason Analysis

The pivot table you provided summarizes the reasons for customer calls to a call center, listing the total number of calls for each reason and a grand total.

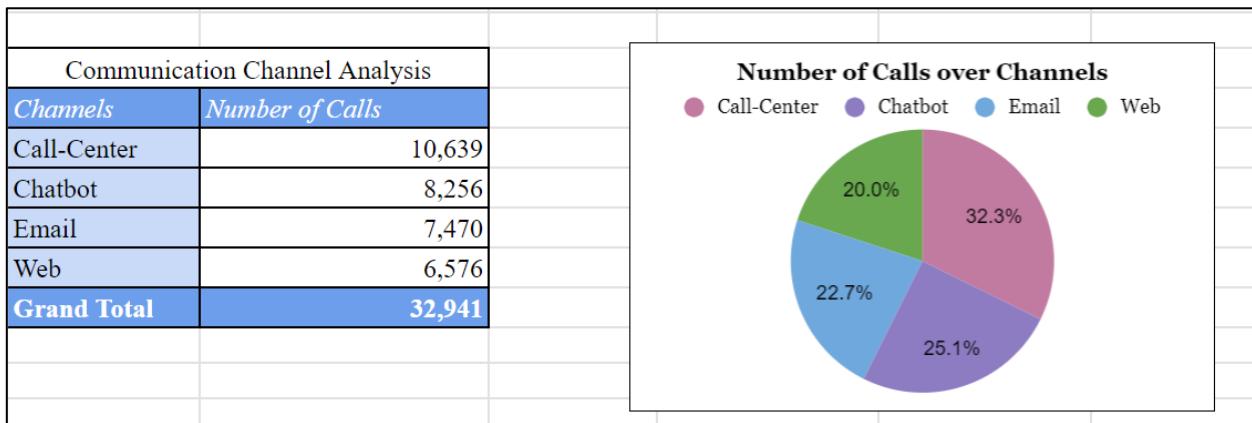
- **Billing Question:** There were 23,462 calls related to billing questions. This reason accounts for the majority of the calls.
- **Payments:** There were 4,749 calls regarding payment issues.
- **Service Outage:** There were 4,730 calls related to service outages.



3.2 Communication Channel Analysis

The pivot table provides an analysis of the communication channels customers use to contact the call center, along with the total number of calls made through each channel.

- **Call-Center:** The call center handled 10,639 calls, making it the most frequently used communication channel.
- **Chatbot:** 8,256 calls were managed through the chatbot, indicating a significant usage of this automated service.
- **Email:** Customers used email to contact the call center 7,470 times.
- **Web:** The web channel (likely involving online forms or self-service options) accounted for 6,576 calls.



3.3 Customer Satisfaction Score across City

Customer Satisfaction Score across Cities



The data shows the average customer satisfaction scores across various cities, with an overall grand total average score of 5.5. Here's a breakdown of the insights:

High Satisfaction Scores:

Lake Charles (8.0) and Kingsport (7.8): These cities have the highest average satisfaction scores, indicating that customers in these locations are particularly pleased with the service they received.

Crawfordsville (7.8) and Laurel (7.7): Also have notably high satisfaction scores, suggesting effective service delivery in these areas.

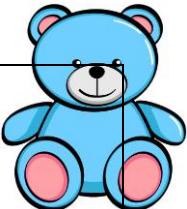
Low Satisfaction Scores:

Ann Arbor (2.3): This city has the lowest average satisfaction score, indicating significant dissatisfaction among customers.

Watertown (3.0) and Katy (3.0): These cities also have very low satisfaction scores, which may be areas of concern for the service provider.

Moderate Satisfaction Scores:

New York City (5.2) and Los Angeles (5.7): Major cities like these have moderate satisfaction scores, which align closely with the overall average. This suggests a consistent level of service across larger urban areas.

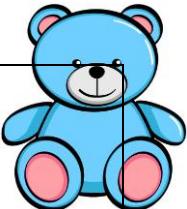


Customer Satisfaction Score across City	
City	Average of Customer_Sat_Score
Abilene	6.4
Aiken	4.8
Akron	6.4
Albany	5.4
Albuquerque	5.5
Alexandria	5.7
Alhambra	5.2
Allentown	6.4
Alpharetta	5.6
Amarillo	5.6
Anaheim	6.3
Anchorage	5.3
Anderson	4.7
Ann Arbor	2.3
Annapolis	6.0
Anniston	6.2

Apache Junction	5.8
Appleton	6.0
Arlington	5.8
Arvada	5.4
Ashburn	5.6
Asheville	5.3
Athens	6.3
Atlanta	5.6
Augusta	5.1
Aurora	5.7
Austin	5.8
Bakersfield	4.7
Baltimore	5.7
Baton Rouge	5.7
Battle Creek	3.5
Beaufort	5.2
Beaumont	5.8
Beaverton	6.1
Bellevue	6.3
Berkeley	6.1
Bethesda	5.1

Danvers	5.2
Biloxi	6.3
Birmingham	5.7
Bismarck	6.8
Bloomington	4.3
Boca Raton	5.8
Boise	5.6
Bonita Springs	5.2
Boston	6.1
Boulder	6.0
Bowie	4.6
Boynton Beach	6.2
Bozeman	5.9
Bradenton	5.5
Brea	5.8
Bridgeport	5.3
Brockton	5.8
Bronx	5.3
Brooklyn	5.7
Brooksville	4.8
Bryan	6.8

Dryan	5.8
Buffalo	5.4
Burbank	4.1
Cambridge	5.3
Camden	4.8
Canton	6.2
Cape Coral	6.2
Carlsbad	3.5
Carol Stream	5.7
Carson City	5.4
Cedar Rapids	6.1
Champaign	6.2
Chandler	5.6
Charleston	5.4
Charlotte	5.5
Charlottesville	5.2
Chattanooga	5.9
Chesapeake	3.8
Cheyenne	6.0
Chicago	5.7
Chico	5.6



Dayton	5.8
Daytona Beach	5.8
Dearborn	4.8
Decatur	6.0
Delray Beach	4.7
Denton	5.9
Denver	5.4
Des Moines	5.1
Detroit	5.6
Dulles	4.1
Duluth	6.7
Durham	5.6
East Saint Louis	6.2
Edmond	5.0
El Paso	5.4
Elizabeth	5.5
Elmira	5.3
Englewood	5.0
Erie	5.9
Escondido	4.6
Eugene	5.8

Fort Worth	5.4
Frankfort	6.3
Frederick	4.8
Fredericksburg	4.0
Fresno	5.7
Fullerton	6.0
Gadsden	5.6
Gainesville	4.7
Gaithersburg	4.6
Galveston	6.0
Garden Grove	6.3
Garland	5.0
Gary	5.0
Gastonia	4.8
Gatesville	6.2
Gilbert	6.8
Glendale	5.5
Grand Forks	5.8
Grand Junction	5.4
Grand Rapids	5.7
Great Neck	6.8

Iowa City	5.2
Irvine	5.8
Irving	6.4
Jackson	6.2
Jacksonville	5.6
Jamaica	5.2
Jefferson City	5.2
Jeffersonville	6.3
Jersey City	5.2
Johnson City	5.3
Johnstown	5.9
Joliet	6.2
Juneau	5.6
Kalamazoo	5.1
Kansas City	5.9
Katy	3.0
Kent	6.8
Killeen	7.0
Kingsport	7.8
Kissimmee	4.6
Knoxville	5.3
Lafayette	5.2

A	B
Montpelier	6.5
Moreno Valley	4.8
Morgantown	5.7
Mount Vernon	6.0
Mountain View	6.6
Muncie	5.1
Murfreesboro	6.1
Muskegon	5.9
Myrtle Beach	5.8
Naperville	5.8
Naples	5.1
Nashville	5.3
New Bedford	7.0
New Brunswick	3.6
New Castle	6.5
New Haven	5.2
New Hyde Park	6.5
New Orleans	5.5
New York City	5.2
Newark	5.6
Newport Beach	4.0



A	B
Savannah	5.7
Schaumburg	5.7
Schenectady	4.8
Scottsdale	5.5
Scranton	5.8
Seattle	5.8
Seminole	5.6
Shawnee Mission	5.8
Shreveport	5.9
Silver Spring	5.1
Simi Valley	6.0
Sioux City	6.9
Sioux Falls	5.5
South Bend	5.4
South Lake Tahoe	5.1
Southfield	5.6
Sparks	3.9
Spartanburg	4.5
Spokane	5.8
Spring	4.2
Spring Hill	5.1

A	B
Waterloo	5.1
Watertown	3.0
West Hartford	5.4
West Palm Beach	5.4
White Plains	5.3
Whittier	5.4
Wichita	5.5
Wichita Falls	6.4
Wilkes Barre	5.0
Wilmington	5.0
Winston Salem	5.5
Winter Haven	5.4
Woburn	4.4
Worcester	5.8
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York	5.6
Young America	5.3
Youngstown	6.0
Zephyrhills	6.1

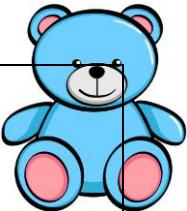
4. Data Visualization

Call Center Performance Dashboard

A **Call Center Performance Dashboard** is a data visualization designed to monitor and analyze the performance of a call center. It typically consolidates key performance indicators (KPIs) into a single interface, allowing managers and decision-makers to quickly assess the efficiency and effectiveness of the call center operations.

1. Customer Emotion Analysis (Bar Chart):

- Purpose:** This chart represents the distribution of customer emotions during their interactions with the call center.
- Explanation:** Each bar in the chart corresponds to a specific emotion such as Neutral, Negative, Very Negative, Very Positive and Positive. The height of each bar indicates the number of customers who exhibited that emotion during their call.

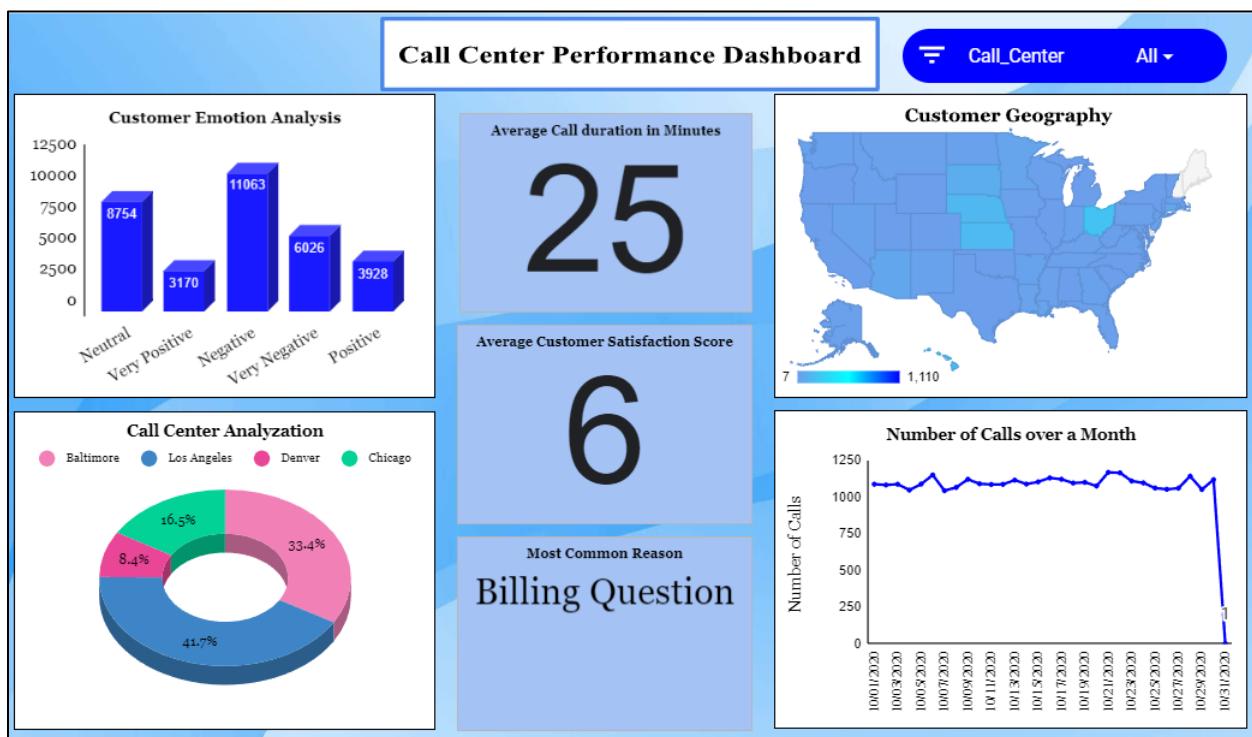


2. Customer Geography (Pie Chart):

- Purpose:** This chart shows the distribution of customers by their geographical location.
- Explanation:** This visualization helps in identifying the regions with the highest customer activity and can inform regional service strategies.

3. Call Center Analysis (Pie Chart):

- Purpose:** This chart provides a breakdown of the call volume handled by different call centers.
- Explanation:** The size of each segment shows the proportion of total calls handled by each center. This is useful for evaluating the performance and workload distribution among various centers.



4. Number of Calls Over a Month (Line Chart):



- **Purpose:** This chart tracks the trend in the number of calls received by the call center over the course of a month.
- **Explanation:** Peaks and troughs in the line can indicate busy periods or times when call volumes were lower, helping to identify patterns or events that influence call volume.

5. Average Call Duration in Minutes (Scorecard Chart):

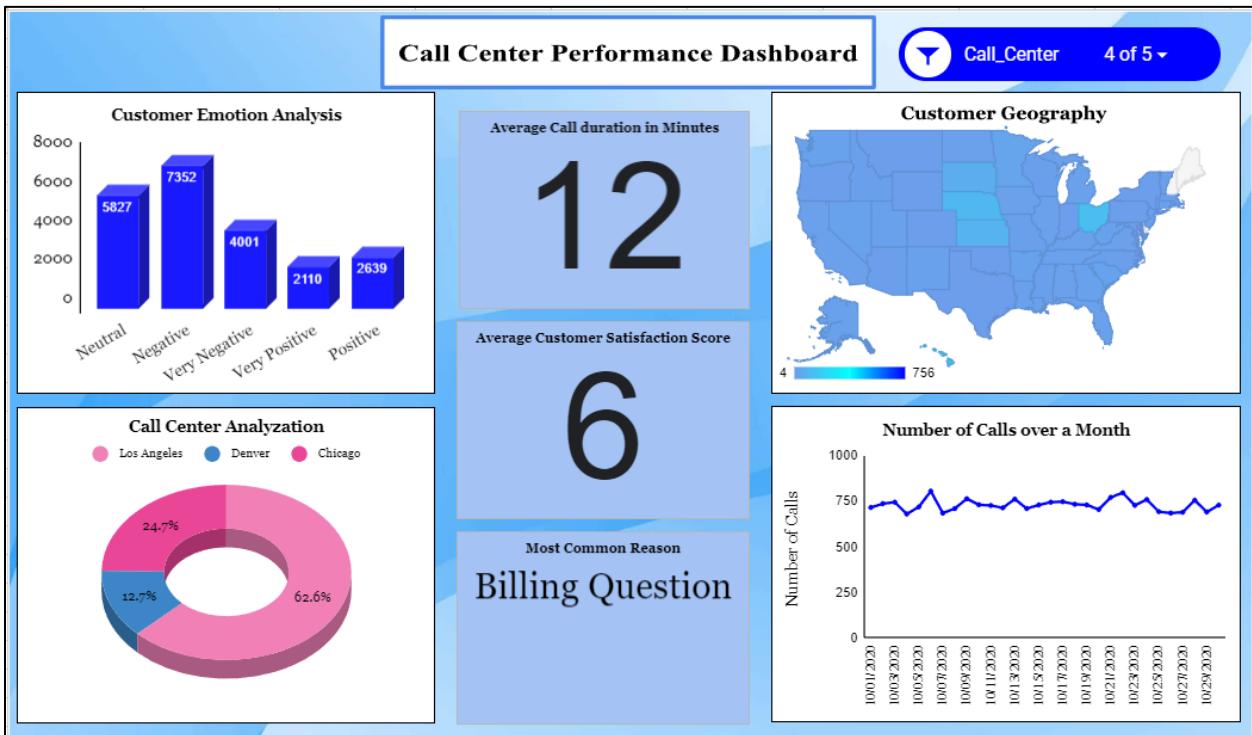
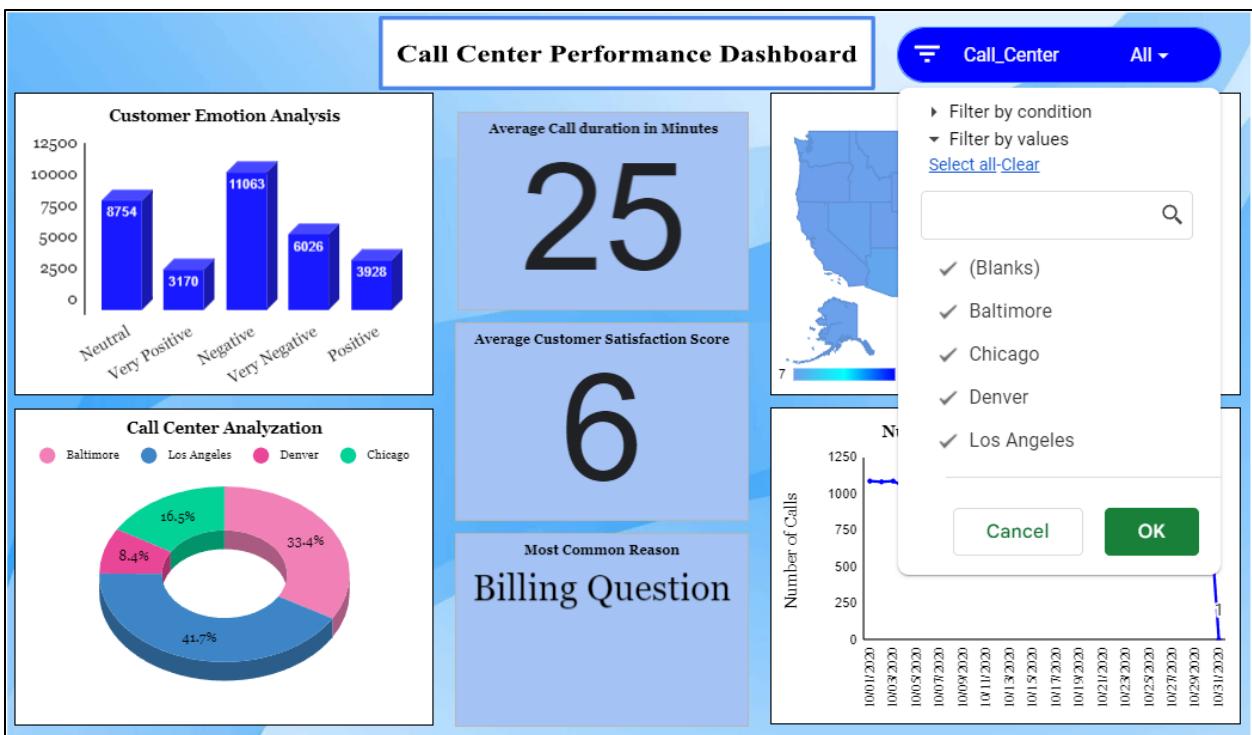
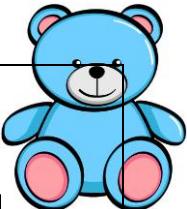
- **Purpose:** This scorecard displays the average length of customer calls in minutes.
- **Explanation:** Longer average durations might indicate more complex issues or potential inefficiencies.

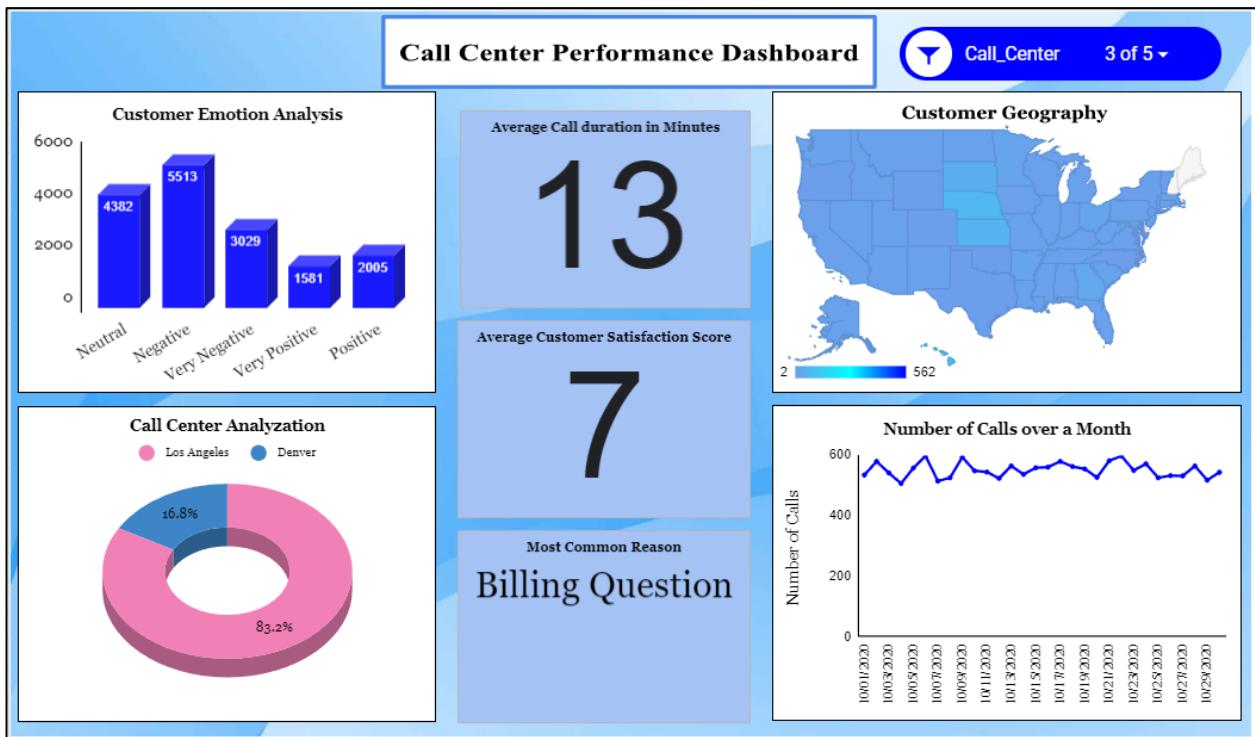
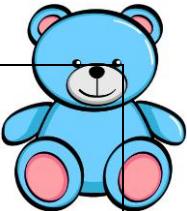
6. Average Customer Satisfaction Score (Scorecard Chart):

- **Purpose:** This scorecard shows the average satisfaction score provided by customers after their calls.
- **Explanation:** Like the Average Call Duration, a higher score suggests that customers are generally satisfied with the service they receive, while a lower score might indicate areas needing improvement.

7. Most Common Reason (Scorecard Chart):

- **Explanation:** This chart displays the most common issue or inquiry that led customers to contact the call center. Understanding the most frequent reasons can help prioritize training and resource allocation to address these issues more effectively.







Conclusion

This Excel project effectively demonstrates the integration of advanced data management, analysis, and visualization techniques to provide actionable insights into call center performance. The project follows a structured approach beginning with meticulous Data Cleaning and Preparation, ensuring the accuracy and reliability of the dataset by addressing duplicates, formatting issues, and missing data. Advanced Excel functions, such as Lookup, Logical, Text, Date and Time, Statistical Functions, Array Formulas, and Dynamic Arrays, were leveraged to manipulate and analyze the data efficiently, showcasing a strong command over Excel's capabilities. The Data Analysis and Reporting phase highlights the power of Pivot Tables, Pivot Charts are summarizing and exploring data trends. Finally, the Data Visualization component underscores the importance of translating data into clear and compelling visuals. Through an interactive dashboard, complex information is presented in an accessible format, aiding stakeholders in quickly understanding key metrics such as customer sentiment, call center efficiency, and customer satisfaction.



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