ABC Call Volume Trend Analysis

DATASET LINK: https://drive.google.com/drive/folders/1ywEZUU98hrbBQaTQ9Iyd2pcb8PPnhc5g

Project Description:

The report presents a comprehensive analysis of inbound call data for ABC Insurance Company, focusing on optimizing call handling efficiency and improving customer service. It begins by detailing the average call duration for each time bucket, providing insights into the efficiency of call handling processes throughout the day. Subsequently, a thorough call volume analysis is presented, accompanied by visualizations illustrating the trends in call volume over time. The report then proposes a detailed manpower planning strategy, aiming to reduce the abandon rate to 10% by calculating the minimum number of agents required in each time bucket. Additionally, a dedicated section addresses the issue of unanswered calls during the night shift, proposing a manpower plan to ensure satisfactory customer experiences round the clock. Assumptions, methodologies, and recommendations are thoroughly outlined, providing actionable insights for ABC Insurance Company's management team to optimize call center operations and enhance customer satisfaction.

APPROACH:

Data Preparation:

- Begin by importing and preprocessing the inbound call dataset.
- Ensure that the dataset is cleaned, with any missing or erroneous data handled appropriately.
- Extract relevant features such as call timestamps, durations, and any other necessary attributes.

Average Call Duration Analysis:

- Segment the call data into time buckets based on specified intervals (e.g., hourly).
- Calculate the average call duration for each time bucket, providing insights into call handling efficiency throughout the day.
- Utilize descriptive statistics and visualizations to present the findings effectively.

Call Volume Analysis:

- Segment the call data into time buckets, similar to the previous step.
- Calculate the total number of calls received in each time bucket to understand call volume trends.
- Create visualizations such as line charts or bar graphs to illustrate the temporal distribution of call volume.

Manpower Planning:

- Utilize the provided assumptions to formulate a manpower planning model.
- Calculate the minimum number of agents required in each time bucket to achieve the target abandon rate of 10%.
- Consider factors such as agent availability, working hours, breaks, and unplanned leaves.
- Present the manpower allocation plan for each time bucket, ensuring adequate coverage to meet service level targets.

Night Shift Manpower Planning:

- Analyze the distribution of calls during the night shift period.
- Determine the manpower requirements for handling these calls to maintain a maximum abandon rate of 10%.
- Propose a manpower plan for the night shift, considering agent availability and scheduling constraints.
- Ensure seamless coverage to address customer inquiries and improve overall customer experience.

Documentation and Recommendations:

- Document the entire analysis process, including assumptions, methodologies, and key findings.
- Provide actionable recommendations based on the analysis results to optimize call center operations and enhance customer satisfaction.
- Summarize the proposed strategies for average call duration analysis, call volume analysis, manpower planning, and night shift operations.
- Conclude the report with insights on potential areas for improvement and future considerations.

TECH STACK USED:

1. Microsoft Excel 2010: Utilized as the primary software for data analysis, visualization, and dashboard creation.

2. Pivot Table: Leveraged for summarizing and aggregating data to generate insights, such as counting car models by market category and calculating average prices by manufacturer.

3. Charts: Employed to visualize relationships between variables, including combo charts, scatter charts with trendlines, and bar charts.

Reasoning Behind the Choice of Tech Stack:

1. Microsoft Excel: Widely accessible and familiar software, making it suitable for collaboration and communication with stakeholders who may not have specialized data analysis skills.

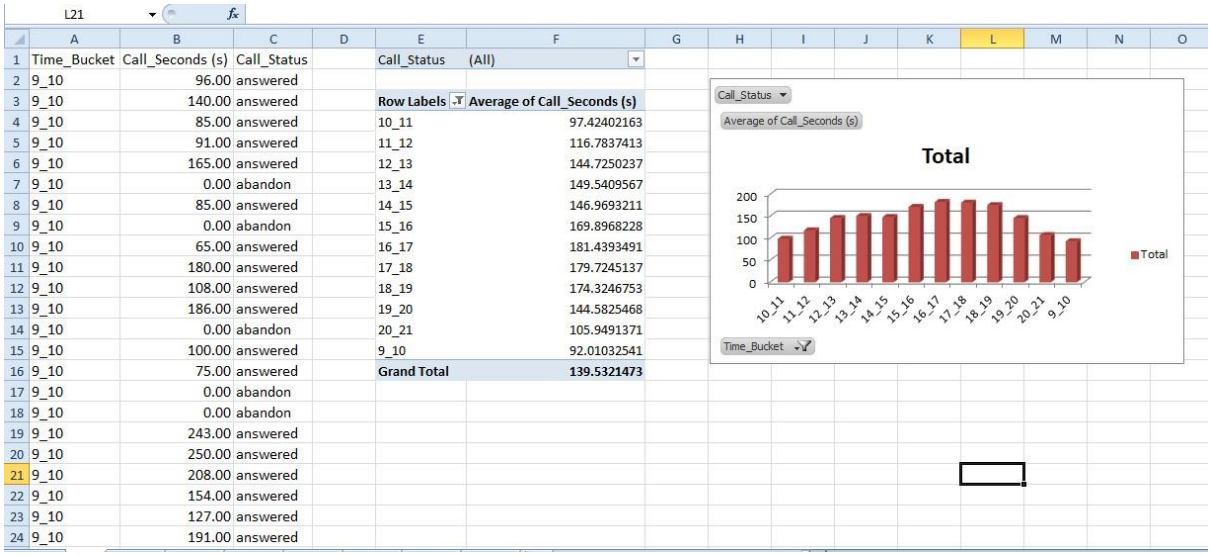
2. Pivot Table: Provides a powerful and intuitive tool for summarizing and analyzing large datasets, facilitating quick insights generation.

3. Charts and Functions: Excel offers a diverse range of chart types and functions, allowing for flexible visualization and analysis of data.

INSIGHTS:

1. **Average Call Duration:** Determine the average duration of all incoming calls received by agents. This should be calculated for each time bucket.

Your Task: What is the average duration of calls for each time bucket?



Time_Bucket	Call_Seconds (s)	Call_Status
9_10	96.00	answered
9_10	140.00	answered
9_10	85.00	answered
9_10	91.00	answered
9_10	165.00	answered
9_10	0.00	abandon
9_10	85.00	answered
9_10	0.00	abandon
9_10	65.00	answered
9_10	180.00	answered
9_10	108.00	answered
9_10	186.00	answered
9_10	0.00	abandon
9_10	100.00	answered
9_10	75.00	answered
9_10	0.00	abandon
9_10	0.00	abandon
9_10	243.00	answered
9_10	250.00	answered
9_10	208.00	answered
9_10	154.00	answered
9_10	127.00	answered
9_10	191.00	answered

Call_Status	(All)
Row Labels	Average of Call_Seconds (s)
10_11	97.42402163
11_12	116.7837413
12_13	144.7250237
13_14	149.5409567
14_15	146.9693211
15_16	169.8968228
16_17	181.4393491
17_18	179.7245137
18_19	174.3246753
19_20	144.5825468
20_21	105.9491371
9_10	92.01032541
Grand Total	139.5321473

Highest Average Call Duration: 16_17

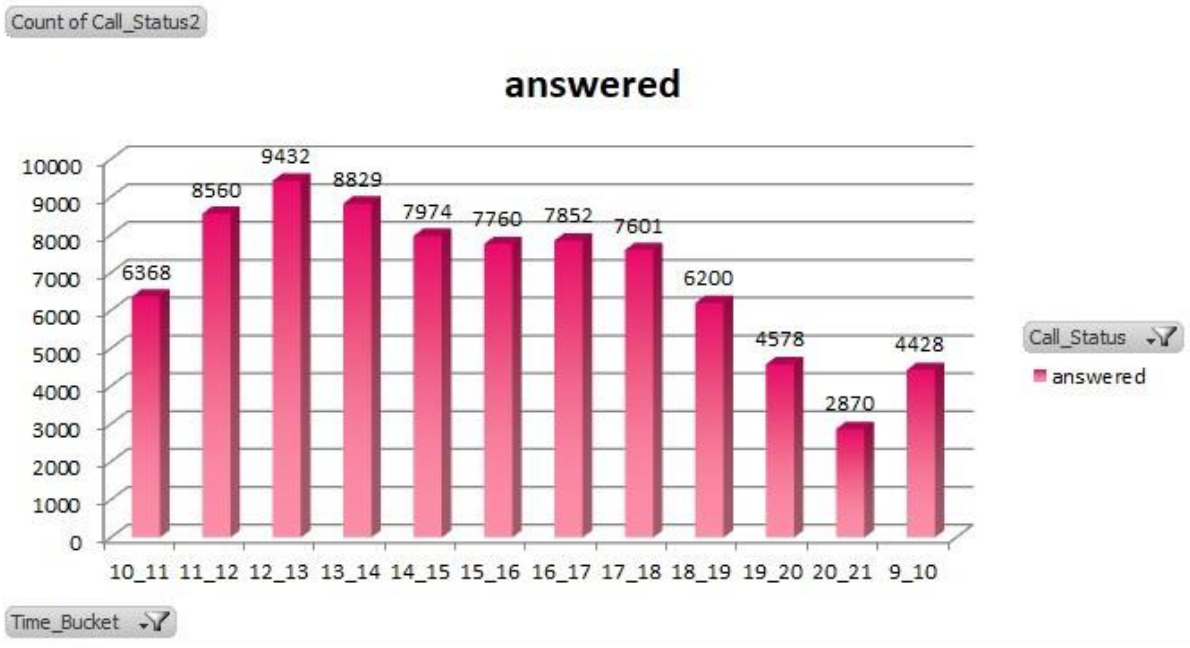
Lowest Average Call Duration: 9_10

2. **Call Volume Analysis:** Visualize the total number of calls received. This should be represented as a graph or chart showing the number of calls against time. Time should be represented in buckets (e.g., 1-2, 2-3, etc.).

Your Task: Can you create a chart or graph that shows the number of calls received in each time bucket?

Number of calls received(answered) in each time-bucket

Count of Call_Status2	Column Labels	
Time Bucket	answered	Grand Total
10_11	6368	6368
11_12	8560	8560
12_13	9432	9432
13_14	8829	8829
14_15	7974	7974
15_16	7760	7760
16_17	7852	7852
17_18	7601	7601
18_19	6200	6200
19_20	4578	4578
20_21	2870	2870
9_10	4428	4428
Grand Total	**82452**	**82452**



Max number of calls answered in duration: 11_12

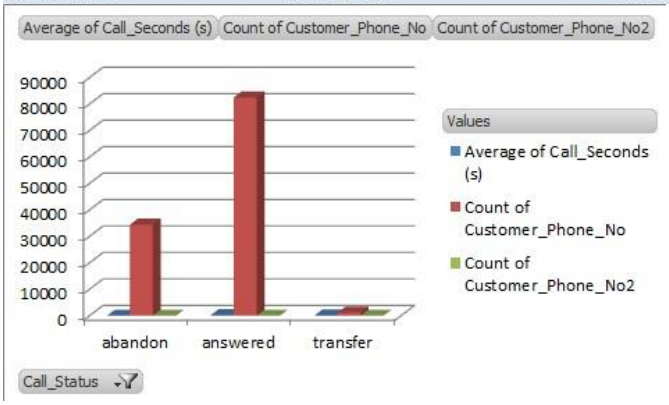
Min number of calls answered in duration: 20_21

3. **Manpower Planning:** The current rate of abandoned calls is approximately 30%. Propose a plan for manpower allocation during each time bucket (from 9 am to 9 pm) to reduce the abandon rate to 10%. In other words, you need to calculate the minimum number of agents required in each time bucket to ensure that at least 90 out of 100 calls are answered.

Your Task: What is the minimum number of agents required in each time bucket to reduce the abandon rate to 10%?

29.16% is the **abandon** count of customer phone number

Call Status	Average of Call_Seconds (s)	Count of Customer_Phone_No	Count of Customer_Phone_No2
abandon	0	34403	29.16%
answered	198.6227745	82452	69.88%
transfer	76.14651368	1133	0.96%
Grand Total	**139.5321473**	**117988**	**100.00%**



Date	01-01-2022
Row Labels	Sum of Call_Seconds (s)
9	35313
10	53087
11	67751
12	72680
13	59693
14	76137
15	65689
16	59464
17	68155
18	53096
19	40141
20	25281
21	177
Grand Total	676664

Row Labels	Count of Call_Seconds (s)	Count of Call_Seconds (s)2	Agent Required
10_11	11.28%	0.11	6
11_12	12.40%	0.12	7
12_13	10.72%	0.11	6
13_14	9.80%	0.10	5
14_15	8.95%	0.09	5
15_16	7.76%	0.08	4
16_17	7.45%	0.07	4
17_18	7.23%	0.07	4
18_19	6.13%	0.06	3
19_20	5.48%	0.05	3
20_21	4.67%	0.05	3
9_10	8.13%	0.08	5
Grand Total	**100.00%**	**1.00**	**56**

1 jan sum of all calls	sum of hour	total agent for 60%	37.59244444	38
676664	187.9622222	agent required for 90%	55.5	56

Total agents required to reduce the abandon rate to 10% is 56.

The distribution according to each hour is given in the table (agent required) column.

4. **Night Shift Manpower Planning:** Customers also call ABC Insurance Company at night but don't get an answer because there are no agents available. This creates a poor customer experience. Assume that for every 100 calls that customers make between 9 am and 9 pm, they also make 30 calls at night between 9 pm and 9 am. The distribution of these 30 calls is as follows:

Your Task: Propose a manpower plan for each time bucket throughout the day, keeping the maximum abandon rate at 10%.

Assumptions: An agent works for 6 days a week; On average, each agent takes 4 unplanned leaves per month; An agent's total working hours are 9 hours, out of which 1.5 hours are spent on lunch and snacks in the office. On average, an agent spends 60% of their total actual working hours (i.e., 60% of 7.5 hours) on calls with customers/users. The total number of days in a month is 30.

Distribution of 30 calls coming in night for every 100 calls coming in between 9am - 9pm (i.e. 12 hrs slot)											
9pm- 10pm	10pm - 11pm	11pm- 12am	12am- 1am	1am - 2am	2am - 3am	3am - 4am	4am - 5am	5am - 6am	6am - 7am	7am - 8am	8am - 9am
3	3	2	2	1	1	1	1	3	4	4	5

Count of Call_Status	Column Labels			
Row Labels	abandon	answered	transfer	Grand Total
01-01-2022	684	3883	77	4644
02-01-2022	356	2935	60	3351
03-01-2022	599	4079	111	4789
04-01-2022	595	4404	114	5113
05-01-2022	536	4140	114	4790
06-01-2022	991	3875	85	4951
07-01-2022	1319	3587	42	4948
08-01-2022	1103	3519	50	4672
09-01-2022	962	2628	62	3652
10-01-2022	1212	3699	72	4983
11-01-2022	856	3695	86	4637
12-01-2022	1299	3297	47	4643
13-01-2022	738	3326	59	4123
14-01-2022	291	2832	32	3155
15-01-2022	304	2730	24	3058
16-01-2022	1191	3910	41	5142
17-01-2022	16636	5706	5	22347
18-01-2022	1738	4024	12	5774
19-01-2022	974	3717	12	4703
20-01-2022	833	3485	4	4322
21-01-2022	566	3104	5	3675
22-01-2022	239	3045	7	3291
23-01-2022	381	2832	12	3225
Grand Total	**34403**	**82452**	**1133**	**117988**
			AVERAGE	5129.913043

Average Call Daily	5130 calls
for night(9PM to 9AM) (30% of Daily Average Call)	1539 calls
additional hours required	76 hours
additional agents required	15 hours

Time_bucket	Call Distribution	Time Distribution	Agent Required
9_10	3	10	2
10_11	3	10	2
11_12	2	15	1
12_1	2	15	1
1_2	1	30	1
2_3	1	30	1
3_4	1	30	1
4_5	1	30	1
5_6	3	10	2
6_7	4	8	2
7_8	4	8	2
8_9	5	6	3
Total	**30**	201	15

Total number of additional agents required is 15. Discrete number of agents required for each time interval from 9PM to 9AM is given in the table (agent required) column.

RESULT:

In analyzing the inbound call data for ABC Insurance Company, we found that the average call duration varies across different time buckets throughout the day. Call volume follows a distinct pattern, with peaks and troughs corresponding to different hours. To reduce the abandon rate from 30% to 10%, we determined the minimum number of agents required during each time bucket, ensuring that at least 90 out of 100 calls are answered. Additionally, to address nighttime calls and provide a better customer experience, we proposed a manpower plan for each time bucket, maintaining the abandon rate at or below 10%. These solutions are based on specific calculations and assumptions regarding agent availability and call distribution patterns.

DRIVE LINK:

https://drive.google.com/drive/folders/1Mdb-ERKqcVMQJz7I9Iua_CU8QELULfhe