PROJECT TITLE: ABC CALL VOLUME TREND ANALYSIS

PROJECT DESCRIPTION:

This project aims to analyze the customer experience (CX) inbound calling team's dataset and identify areas for improvement to enhance the overall customer experience. To handle the project, we will first explore the dataset using various statistical techniques to gain insights into the inbound call center's performance. We will use descriptive statistics to understand the dataset's distribution and use data visualization techniques to identify patterns and relationships between variables. The objective of analyzing the CX inbound calling team's dataset is to gain insights into the inbound call center's performance and identify areas for improvement to enhance the overall customer experience.

APPROACH:

The process of gathering information i.e by reading the description, understanding the dataset, perform descriptive analysis to gain insights into the data and tasks to do. By using Microsoft Excel further continued to use statistics for the tasks. Created the pivot table with Excel, performed the tasks, faced many errors when working, and took a lot of time clearing those errors.

TECH-STACK USED

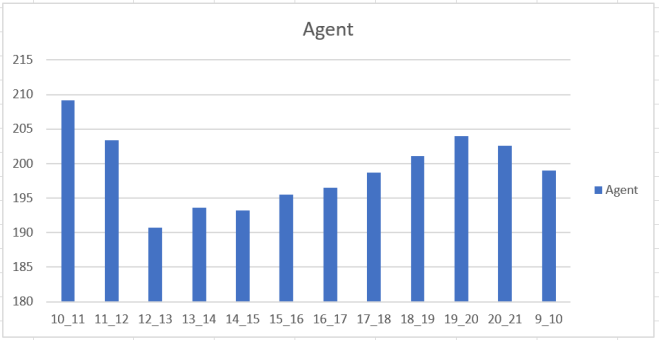
Excel is used as a tech stack because it has many built-in features that are useful for data analysis and provides various features like graphs and pivot tables used to summarise data and perform calculations. These two are the key components of this analysis. Excel provides a range of functions and formulas that can be used to perform complex calculations and manipulate data.

TASKS PERFORMED:

TASK 1

1. **Calculate the average call time duration for all incoming calls received by agents (in each Time_Bucket).**

Average of Call_Seconds (s)	Column Labels	
Row Labels	Agent	Grand Total
10_11	209.146173	209.146173
11_12	203.3522837	203.352284
12_13	190.7582262	190.758226
13_14	193.5996208	193.599621
14_15	193.196702	193.196702
15_16	195.4858855	195.485886
16_17	196.542932	196.542932
17_18	198.7127846	198.712785
18_19	201.0931383	201.093138
19_20	203.9389068	203.938907
20_21	202.5537849	202.553785
9_10	199.0057078	199.005708
Grand Total	**197.7097159**	**197.709716**

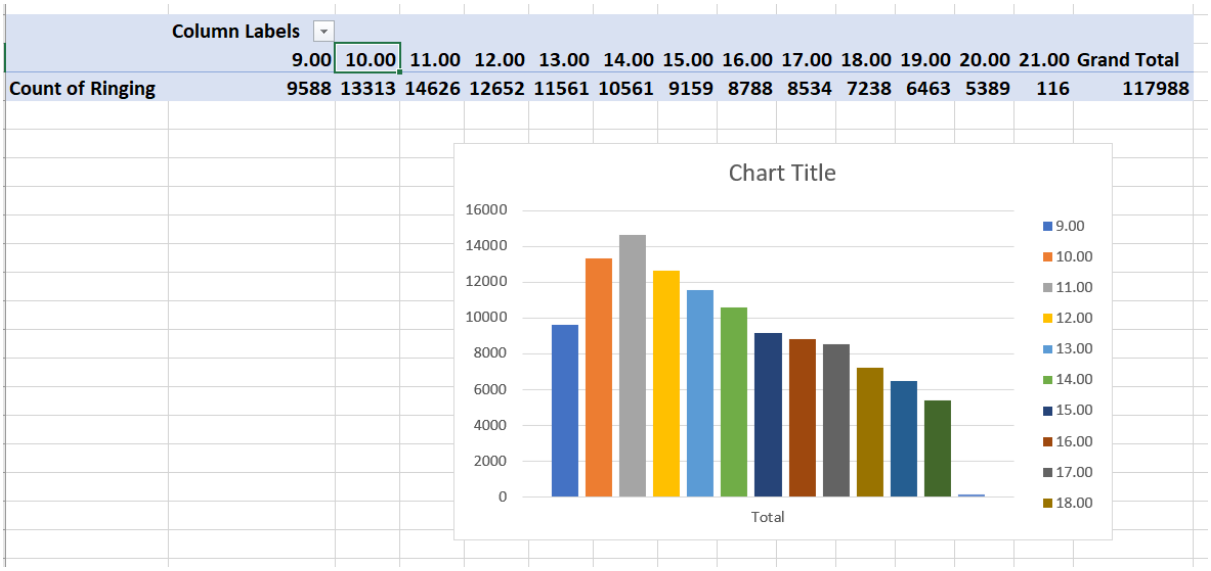


The above screenshot has the tasks completed. The pivot shows the average of the call time duration for all the incoming calls received by the agents. The same pivot table is visualized in the form of a clustered column chart.

TASK 2

2. Show the total volume/ number of calls coming in via charts/ graphs [Number of calls v/s Time]. You can select the time in a bucket form (i.e. 1-2, 2-3, …..)

The above screenshot has the task completed. The pivot table shows the total volume i.e the number of incoming calls in each time bucket. The same pivot table is visualized in the form of a clustered column chart.



Column Labels	9.00	10.00	11.00	12.00	13.00	14.00	15.00	16.00	17.00	18.00	19.00	20.00	21.00	Grand Total
Count of Ringing	9588	13313	14626	12652	11561	10561	9159	8788	8534	7238	6463	5389	116	117988

The above two tasks were somewhat easy to perform. The remaining two tasks have some assumptions and require a lot of insights to perform. The next tasks will be explained in detail

TASK 3

3. As you can see current abandon rate is approximately 30%. Propose a manpower plan required during each time bucket [between 9am to 9pm] to reduce the abandon rate to 10%. (i.e. You have to calculate minimum number of agents required in each time bucket so that at least 90 calls should be answered out of 100.)

The ABC company receives a lot of incoming calls from customers in which 30% of the calls were abandoned i.e not attended. In a total of 100 calls 30 calls were not attended. Our task is to reduce the percentage of abandonment from 30% to 10% i.e in a total of 100 calls 90 calls must be attended by scheduling a manpower plan for each of the time-bucket.

The analysis was begin by calculating the percentage and sum of calls answered, transferred, and abandoned. The pivot table shows that the percentage and sum of calls abandoned and transferred is near 30% **The pivot table is shown below**

Row Labels	% of total calls	Sum of total number of calls	Sum of Call_Seconds (s)
abandon	29.16%	34403	0
answered	69.88%	82452	16376845
transfer	0.96%	1133	86274
Grand Total	**100.00%**	**117988**	**16463119**

Dividing the "sum of answered call_seconds" by the "sum of total number of call seconds". Obtained THE AVERAGE TIME OF CALL ANSWERED IS 198.618 seconds

Then calculated the percentage of incoming calls in each category(abandoned, answered, transferred) and in each time_bucket. **The pivot table is shown below.**

Count of Ringing	Column Labels											
Row Labels	10_11	11_12	12_13	13_14	14_15	15_16	16_17	17_18	18_19	19_20	20_21	9_10	Grand Total
abandon	5.86%	5.11%	2.60%	2.22%	2.10%	1.03%	0.63%	0.66%	0.79%	1.57%	2.22%	4.36%	29.16%
answered	5.40%	7.25%	7.99%	7.48%	6.76%	6.58%	6.65%	6.44%	5.25%	3.88%	2.43%	3.75%	69.88%
transfer	0.03%	0.03%	0.12%	0.10%	0.09%	0.16%	0.16%	0.13%	0.09%	0.03%	0.01%	0.01%	0.96%
Grand Total	**11.28%**	**12.40%**	**10.72%**	**9.80%**	**8.95%**	**7.76%**	**7.45%**	**7.23%**	**6.13%**	**5.48%**	**4.67%**	**8.13%**	**100.00%**

Then calculated how many calls are received each day and in each time bucket. The pivot table is shown below.

Count of Ringing	Column Labels											
Row Labels	10_11	11_12	12_13	13_14	14_15	15_16	16_17	17_18	18_19	19_20	20_21	9_10	Grand Total
01-Jan	552	487	469	373	433	367	331	372	337	235	329	359	4644
02-Jan	440	399	346	348	254	233	286	207	223	202	120	293	3351
03-Jan	462	458	489	497	479	439	452	376	334	290	218	295	4789
04-Jan	408	546	555	534	484	399	445	419	321	325	254	423	5113
05-Jan	468	538	479	465	445	388	386	364	344	258	219	436	4790
06-Jan	547	592	472	454	408	422	433	356	320	311	236	400	4951
07-Jan	563	790	492	470	408	362	380	358	275	240	251	359	4948
08-Jan	592	621	493	418	391	393	360	352	279	225	201	347	4672
09-Jan	534	453	358	314	257	258	260	260	253	217	174	314	3652
10-Jan	473	617	490	478	441	393	332	419	328	354	296	362	4983
11-Jan	430	519	475	466	376	411	401	372	299	302	268	318	4637
12-Jan	455	630	521	432	424	326	326	367	292	283	202	385	4643
13-Jan	347	459	404	424	423	377	372	307	237	190	207	376	4123
14-Jan	260	294	346	306	237	226	298	293	250	240	195	210	3155
15-Jan		398	397	325	345	286	319	313	253	215	134	73	3058
16-Jan	738	515	268	455	361	375	354	400	439	430	645	162	5142
17-Jan	3565	3443	3080	2673	2145	1228	986	861	746	579	376	2665	22347
18-Jan	481	533	523	389	557	650	478	617	427	423	299	397	5774
19-Jan	474	524	495	411	409	453	391	343	317	302	258	326	4703
20-Jan	438	558	448	418	411	374	351	362	281	257	149	275	4322
21-Jan	394	496	358	302	334	282	309	313	247	206	161	273	3675
22-Jan	334	382	346	306	261	281	289	256	231	187	162	256	3291
23-Jan	358	374	348	303	278	236	249	247	205	192	151	284	3225
Grand Total	**13313**	**14626**	**12652**	**11561**	**10561**	**9159**	**8788**	**8534**	**7238**	**6463**	**5505**	**9588**	**117988**

Cannot schedule manpower plan for each day. So took **the average of the total calls received in 23 days(GRAND TOTAL) which was 5130.**

Considering the data of Jan-16 because it is close to the average that we found above.

We found that each call that was answered was spoken at an average time of **198.618 seconds**

To find what would the total call time duration would be if we attend all the calls that we receive in each time bucket

To calculate, multiply the "**number of calls in each time_bucket" and "THE AVERAGE TIME OF CALL ANSWERED**" we get the call time duration of each time_bucket in seconds. i.e

Then converted from seconds to hours.

	10_11	11_12	12_13	13_14	14_15	15_16	16_17	17_18	18_19	19_20	20_21	9_10	Total
16-Jan	738	515	268	455	361	375	354	400	439	430	645	162	5142
Call time duration in second	146580.084	102288.27	53229.624	90371.19	71701.1	74481.75	70310.77	79447.2	87193.302	85405.74	128108.61	32176	1021293.8
Call time duration in minute	2443.0014	1704.8045	887.1604	1506.187	1195.018	1241.363	1171.846	1324.12	1453.2217	1423.429	2135.1435	536.27	17021.563
Call time duration in hrs	40.71669	28.4134083	14.7860067	25.10311	19.91697	20.68938	19.53077	22.068667	24.220362	23.72382	35.585725	8.9378	283.69271

Assuming that the 100% full focussed working hours of the employees is **5hrs**

When we **divide** the **call time duration(in hours) by** 100% full focussed working hours of the employee which is **5hrs** we get the **B employees needed/required** in each **time bucket.**

	10_11	11_12	12_13	13_14	14_15	15_16	16_17	17_18	18_19	19_20	20_21	9_10	Total
16-Jan	738	515	268	455	361	375	354	400	439	430	645	162	5142
Call time duration in second	146580.084	102288.27	53229.624	90371.19	71701.1	74481.75	70310.77	79447.2	87193.302	85405.74	128108.61	32176	1021293.8
Call time duration in minute	2443.0014	1704.8045	887.1604	1506.187	1195.018	1241.363	1171.846	1324.12	1453.2217	1423.429	2135.1435	536.27	17021.563
Call time duration in hrs	40.71669	28.4134083	14.7860067	25.10311	19.91697	20.68938	19.53077	22.068667	24.220362	23.72382	35.585725	8.9378	283.69271
Calculation of emp	8.143338	5.68268167	2.95720133	5.020622	3.983394	4.137875	3.906154	4.4137333	4.8440723	4.744763	7.117145	1.7876	56.738542

If we add the employees of all the time_bucket we get the total number of employees required for each day i.e from (9am to 9pm)

The total number of employees required for each day is **58.**

	10_11	11_12	12_13	13_14	14_15	15_16	16_17	17_18	18_19	19_20	20_21	9_10	Total
16-Jan	738	515	268	455	361	375	354	400	439	430	645	162	5142
Call time duration in second	146580.084	102288.27	53229.624	90371.19	71701.1	74481.75	70310.77	79447.2	87193.302	85405.74	128108.61	32176	1021293.8
Call time duration in minute	2443.0014	1704.8045	887.1604	1506.187	1195.018	1241.363	1171.846	1324.12	1453.2217	1423.429	2135.1435	536.27	17021.563
Call time duration in hrs	40.71669	28.4134083	14.7860067	25.10311	19.91697	20.68938	19.53077	22.068667	24.220362	23.72382	35.585725	8.9378	283.69271
Calculation of emp	8.143338	5.68268167	2.95720133	5.020622	3.983394	4.137875	3.906154	4.4137333	4.8440723	4.744763	7.117145	1.7876	56.738542
Employees required	8	6	3	5	4	4	4	5	5	5	7	2	58

TASK 4

4. Let's say customers also call this ABC insurance company in night but didn't get answer as there are no agents to answer, this creates a bad customer experience for this Insurance company. Suppose every 100 calls that customer made during 9 Am to 9 Pm, customer also made 30 calls in night between interval [9 Pm to 9 Am] and distribution of those 30 calls are as follows:

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

Now propose a manpower plan required during each time bucket in a day. The maximum Abandon rate assumption would be the same 10%.

In the given task it is mentioned only 30% of calls come at night when compared to the day shift.

Using a month's data found that the AVERAGE of total calls received each day was 5130 and 30% of 5130 is 1539.

For each today the call duration of these night calls will be 84.909hrs

The 100% full focussed working hours of the employees will be 4hrs because of the night-time.

So if we divide the call time duration by the working hours of the employees i.e 4hrs

No of the employees needed are 21

According to the distribution

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

Based on the distribution provided, it seems that having a single employee in each time_bucket should be sufficient, as the maximum number of calls received in a time_bucket is 5, and it typically takes around 20 minutes to handle these calls. Therefore, it is reasonable to assume that one employee can handle this volume of calls effectively.

INSIGHTS OBTAINED

1. The average call_duration by agents is **197.7 and** also for each time_bucket has been found
2. 10_11 time_bucket has the highest number of call_duration and smallest is 12_13
3. The total number of calls has been found by counting the ringing for each time_bucket
4. The total number of calls received is found i.e 117988.
5. The percentage and sum of calls abandoned and transferred is nearly 30% was confirmed
6. Each call that was answered was spoken at an average time of **198.618 seconds**
7. How many calls are received each day in each time_bucket and its total has been found
8. The average of total calls received as a whole is 117988.
9. By multiplying the “**number of calls in each time_bucket” and “THE AVERAGE TIME OF CALL ANSWERED**” we got the insight of call time duration of each time_bucket in seconds and then converted them to hours.

10. The number of employees required to reduce the abandoned calls to 10% is 58.
11. For each today the call duration of the night calls according to insights obtained will be 84.909hrs
12. a single employee in each time_bucket should be sufficient, as the maximum number of calls received in a time_bucket is 5, and it typically takes around 20 minutes to handle these calls. Therefore, it is reasonable to assume that one employee can handle this volume of calls effectively.

RESULTS

Capable to exhibit a thorough understanding of the issue at hand, demonstrating the capacity to recognize the complexities involved and recognize the key information or columns needed for the solution. able to offer deep insight into the situation, clearly visualize the circumstance and scenario, and offer well-considered recommendations in line with it.