

ABC Call Volume Trend Analysis

Project Description

This Project involves analysis of inbound calls received by a company named ABC, which operates in the insurance sector to find the minimum manpower required to reduce abandoned calls and achieve 90% success rate.

The tasks involve two main components: Manpower Planning and Night Shift Manpower Planning.

1. **Manpower Planning:** The goal is to reduce the abandon rate of calls to 10%. This involves calculating the minimum number of agents required in each time bucket (from 9 am to 9 pm) to ensure that at least 90 out of 100 calls are answered.
2. **Night Shift Manpower Planning:** This task addresses the issue of customers calling at night (between 9 pm and 9 am) and not getting an answer due to the unavailability of agents. The assumption is that for every 100 calls made between 9 am and 9 pm, customers also make 30 calls at night. The task is to propose a manpower plan for each time bucket throughout the day, keeping the maximum abandon rate at 10%.

The tasks are based on several assumptions about the agents' working hours, leaves, and the total number of days in a month. These assumptions will be crucial in formulating the manpower plans.

Please note that the actual distribution of agents may need to be adjusted based on other factors such as agent availability, call patterns, etc. Also, the number of agents has been rounded to the nearest whole number for practical purposes, so minor adjustments might be needed.

As a data analyst, first I will understand the project requirements and purpose and then I will understand the data which is provided in the project attachment and will perform analysis to get the meaningful insights.

Analysis:

The tasks are based on several assumptions about the agents' working hours, leaves, and the total number of days in a month. These assumptions will be crucial in formulating the manpower plans.

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Approach:

1. **Data Cleaning:** Checking for missing or inconsistent data. Handle outliers if necessary. This step ensures that the data is accurate and will not lead to misleading analysis results.

In the given Dataset below variables/columns as missing data (blank cells):

Column Name	Blank cell count
Agent Name	34198
Agent_ID	34198
Wrapped_By	47877

2. Handling Missing Data: Replace the missing data with the help appropriate descriptive statistics calculations. Below are the methods used to replace the missing data in the dataset of this project.

Column Name	Blank cell count	Blank cells replace method	Replaced value
Agent Name	34198	Value from cell above blank cell	
Agent_ID	34198	Value from cell above blank cell	
Wrapped_By	47877	Most Repeated Value	Agent

3. Descriptive Statistics: Generating basic statistics such as mean, min, max. This will give a general understanding of the dataset's distribution.
4. Identifying relationships between different variables in the dataset. This can help in understanding how different attributes relate to the likelihood of default.
5. Visual Exploratory Data Analysis: Using plots and charts to visualize the data and identify relations. This could include:
 - Stacked Column charts for categorical variables like Call status
 - Combo Charts for numerical variables likes Agents distribution, no.of calls to find their distribution and relationship.
 - Line plots to understand the trends over time.

Throughout this process, my goal was to provide clear, accurate, and helpful insights and answers to questions.

Tech-Stack Used

The software and versions you used for the project:

Microsoft Excel

Pivot Tables to classify the data and to calculate Mean, etc.

Power pivot to create measures and calculated columns like Call Minutes.

Insights:

I will provide my insights in the form of answers for the questions posed by management team

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?

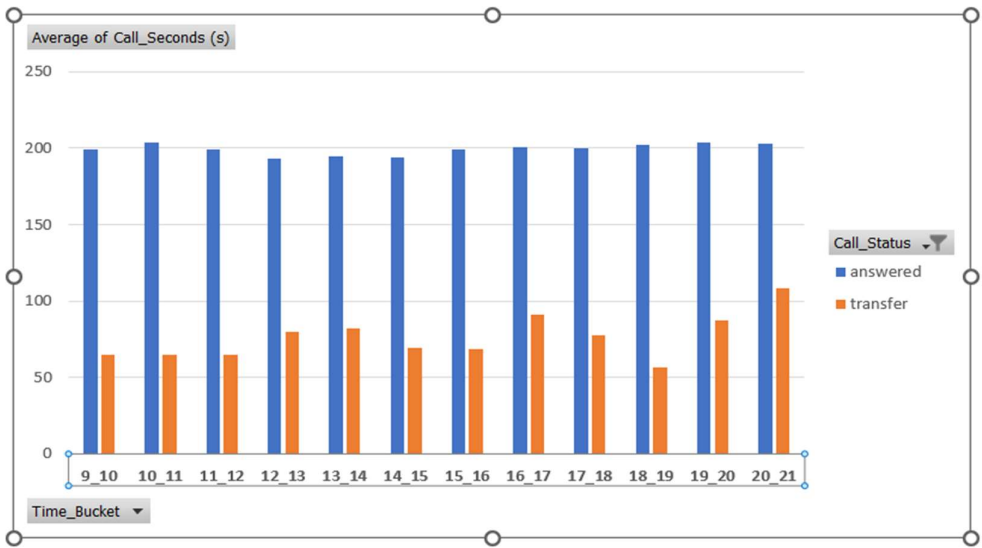
Output:

Pivot Table:

Average Call Duration:

Average of Call_Seconds (s)			
Column Labels			
Time Bucket	answered	transfer	Grand Total
9_10	199.0691057	65.18181818	198.7373282
10_11	203.3310302	64.52941176	202.5938769
11_12	199.2550234	64.63157895	198.6600372
12_13	192.8887829	79.82312925	191.1536695
13_14	194.7401744	82.45217391	193.2963998
14_15	193.6770755	69.30357143	191.9543656
15_16	198.8889175	68.68648649	195.8571429
16_17	200.8681864	91.38624339	198.2948638
17_18	200.2487831	77.85333333	197.8801445
18_19	202.5509677	56.62857143	200.1208565
19_20	203.4060725	87.67567568	202.4782232
20_21	202.845993	108.2	202.5173611
Grand Total	198.6227745	76.14651368	196.9626009

Graph:



Above Pivot table and Graph shows that overall average call duration is 196.96 seconds, which is around 3.3 minutes.

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.).

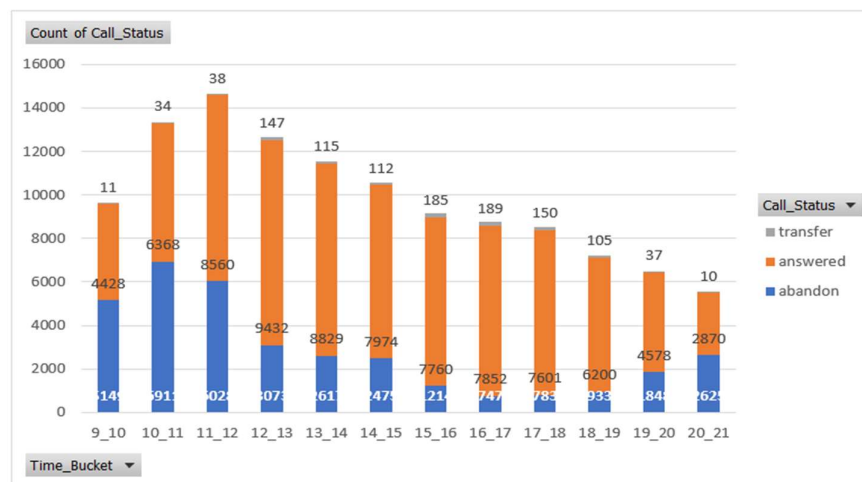
Your Task: Can you create a chart or graph that shows the number of calls received in each time bucket?

OUTPUT:

Pivot Table:

Call Volume Analysis:					
Count of Call_Status		Column Labels			
Time Bucket		abandon	answered	transfer	Grand Total
9_10		5149	4428	11	9588
10_11		6911	6368	34	13313
11_12		6028	8560	38	14626
12_13		3073	9432	147	12652
13_14		2617	8829	115	11561
14_15		2475	7974	112	10561
15_16		1214	7760	185	9159
16_17		747	7852	189	8788
17_18		783	7601	150	8534
18_19		933	6200	105	7238
19_20		1848	4578	37	6463
20_21		2625	2870	10	5505
Grand Total		34403	82452	1133	117988

Graph:



Both Pivot table and stacked graph shows max number calls received in 11_12 time bucket and max calls abandoned in 10_11 time bucket.

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

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%?

OUTPUT:

Minimum Manpower Calculation:

Total time for per day calls	Agents Required
21	4.60
29	6.51
32	7.02
26	5.84
24	5.40
22	4.90
19	4.33
19	4.21
18	4.08
16	3.50
14	3.16
12	2.69
253	56.13

Manpower Distribution for 90% success rate

Total calls for 90%		Calls per day for 90%		Distribution of Agents	
%	Success rate		Success rate		
1%	8629.2		375.18		21
.%	11981.7		520.94		29
.%	13163.4		572.32		32
1%	11386.8		495.08		28
1%	10404.9		452.39		25
1%	9504.9		413.26		23
.%	8243.1		358.40		20
1%	7909.2		343.88		19
1%	7680.6		333.94		19
1%	6514.2		283.23		16
1%	5816.7		252.90		14
1%	4954.5		215.41		12
1%	106189.2		4616.921739		

Above tables show that minimum agents required to handle inbound calls with 90% success rate is 57. As per distribution of agents for 12 time buckets agents required vary from 57 to 62.

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%.

OUTPUT:

No.of_Agents_required _for_night		Distribution of agents under each time bucket	
4	2	8	8
4	2	8	8
9	1	5	5
9	1	5	5
5	1	3	3
5	1	3	3
5	1	3	3
5	1	3	3
4	2	8	8
6	2	10	10
6	2	10	10
2	3	13	13
4	17		

Above table shows minimum agents required to handle night shift is 17, but as per distribution across 12 time buckets it may vary between 17 to 18.

Result:

1. **Average Time per Call:** The average duration of a call is 3.3 minutes. This is the average time an agent spends on a call with a customer.
2. **Work Hours on Calls per Agent:** Each agent spends an average of 4.5 hours per day on calls. This is the total time during which an agent is actively engaged in calls.
3. **UPE:** The Unit of Production Equivalent (UPE) is 82 calls per day. This is the average number of calls handled by an agent in a day.
4. **UPE per Hour (Average):** On average, an agent handles 18 calls per hour. This is the rate at which calls are handled throughout the day.
5. **Max Calls Received and Abandoned:** The maximum number of calls received and abandoned is during the 11-12 time bucket. This could indicate a high volume of calls and/or insufficient staffing during this period.
6. **Minimum Age Agents Required:** A minimum of 57 agents are required to achieve a 90% success rate. This means that at least 90 out of 100 calls are answered.
7. **Minimum Agents for Night Shift:** A minimum of 17 agents are required for the night shift to maintain a 90% success rate.



Drive Link:

For Excel files:

<https://docs.google.com/spreadsheets/d/1epw1brWVikQJjVCvUf8DZSsCQIR7U9xk/edit?usp=sharing&ouid=106678072727235537296&rtpof=true&sd=true>