# Objective Questions:

### What is the total no. of attributes present in the data?

**Tickets Sheet:** This sheet contains detailed information about each IT support ticket raised by employees.

### Attributes:

* + ID (Unique identifier for the ticket)
  + Ticket Fetcha (Date of the ticket)
  + Employee ID (ID of the employee who raised the ticket)
  + Agent ID (ID of the agent assigned to the ticket)
  + Request Category (Category of the request, e.g., Login Access, System, Software)
  + Issue Type (Type of issue, e.g., IT Error, IT Request)
  + Severity (Severity of the issue)
  + Priority (Priority level of the issue)
  + Resolution Time (Days) (Time taken to resolve the ticket)
  + Satisfaction Rate (Satisfaction rate provided by the employee on a 1-5 scale)

Total Attributes in Tickets Sheet: 10 attributes

**IT Agents Sheet**: This sheet contains information about the IT agents.

### Attributes:

* + Agent ID (Unique identifier for the agent)
  + Full Name (Full name of the agent)
  + Email (Email address of the agent)
  + Year of Birth (Year the agent was born)
  + Month of Birth (Month the agent was born)
  + Day of Birth (Day the agent was born)

Total Attributes in IT Agents Sheet: 6 attributes

### Observations:

* + The dataset consists of 16 attributes in total, spread across two sheets.
  + These attributes provide comprehensive data about the tickets and the agents handling them, which will be crucial for the analysis in later questions, such as evaluating agent performance, ticket resolution times, and satisfaction levels.

### Which columns have inconsistent or missing values, and what is the count of such values?

The dataset does not contain any missing or inconsistent values in either the Tickets or IT Agents sheets.

### What is the average daily ticket volume over time?

The average daily ticket volume provides insights into how many tickets are typically raised each day. This helps evaluate the workload and resource allocation for IT agents.

### Calculation:

**Formula**: Average Daily Ticket Volume = Total Tickets / Total Days

**Total Tickets**: 97,498 (calculated using the COUNT function on the Ticket IDs

column).

**Total Days**: 1,826 (calculated as the difference between the maximum and minimum dates in the dataset, plus 1).

Average Daily Ticket Volume = 97,498 / 1,827 ≈ 53.36

### What is the distribution of ticket categories (e.g., Login Access, System, Software)?

Tickets are distributed as per below Table.

|  |  |
| --- | --- |
| **Category** | **Count of ID Ticket** |
| Hardware | 9733 |
| Login Access | 29193 |
| Software | 19570 |
| System | 39002 |
| **Grand Total** | **97498** |

Table 1.1

* + **Highest Ticket Volume** :The "System" category has the highest ticket volume, contributing to 40% of the total tickets (39,002 out of 97,498).
  + **Lowest Ticket Volume** :The "Hardware" category has the lowest ticket volume, contributing to 10% of the total tickets (9,733 out of 97,498).
  + **Login Access and Software :**Together, these categories make up approximately 52% of the total tickets.

### How many tickets has each agent handled? Data Reference:

The analysis of agent performance is based on Table 2.1: Pivot for Agent Performance in the Performance worksheet of the provided Excel file.

### How can you extract the domain from the email addresses in the IT Agents sheet?

The Excel Formula for extracting domain name from email Id is

### =Right(email cell,Len(email cell)-Find(“@”,email cell)

The result looks like the below table

|  |  |  |  |
| --- | --- | --- | --- |
| **Agent ID** | **Full Name** | **Email** | **Domain** |
| 1 | Mata Lucero | [lucero.mata@fp20analytics.com](mailto:lucero.mata@fp20analytics.com) | fp20analytics |
| 2 | Jesus Grajeda | [jesus.grajeda@fp20analytics.com](mailto:jesus.grajeda@fp20analytics.com) | fp20analytics |
| 3 | Elena Velez | [elena.velez@fp20analytics.com](mailto:elena.velez@fp20analytics.com) | fp20analytics |

Table 1.2

You can refer the Excel Worksheet IT Agents for the detail formula.

### How can you find the full name of an agent given their Agent ID?

To find out full name of Agent from Agent ID worksheet we can use Vlookup formula. Formula for extracting full name of agent is as below:

=Vlookup(agent\_id, agent\_id table, index\_value, range\_lookup)

The VLOOKUP formula is used to look up the Agent ID in the Agent ID worksheet and return the corresponding full name of the agent.

### Parameters in the formula:

* + agent\_id: The unique identifier for the agent.
  + agent\_id\_table: The range in the Agent ID worksheet containing the data (e.g., A1).
  + index\_value: The column number in the range that contains the full name.
  + range\_lookup: Set to FALSE for an exact match.

Please Refer to **excel file** worksheet named **tickets** and column name **Agent Full Name**

### What is the count of each issue type (e.g., IT Error, IT Request)?

The count of each issue type is:

|  |  |
| --- | --- |
| **Issue** | **Count of ID Ticket** |
| IT Error | 24278 |
| IT Request | 73220 |
| **Grand Total** | **97498** |

Table 1.3

### What is the daily average resolution time for tickets?

The Daily Average Resolution Time for Tickets is **4.55.**

### How has the volume of tickets changed over time?

The volume of ticket is increased every year as we can see in below table

|  |  |  |
| --- | --- | --- |
| **Year** | **Count of ID Ticket** | **Percentage Change** |
| **2016** | **13051** | **0%** |
| **2017** | **14915** | **12%** |
| **2018** | **18954** | **21%** |
| **2019** | **21490** | **12%** |

|  |  |  |
| --- | --- | --- |
| **2020** | **29088** | **26%** |
| **Grand Total** | **97498** |  |

Table 1.4

### What is the average age of the IT agents?

The Average Age of IT Agent is **41.04 Years.**

### Is there a correlation between the severity of issues and the resolution time?

**Approach:**

* + The correlation function was applied to the columns representing Severity of Issues and Resolution Time. Correlation measures the strength and direction of the relationship between two variables.

### Observation:

* + The correlation coefficient obtained is close to zero, which indicates a very weak relationship between the severity of the issues and the resolution time.

### Conclusion:

* + There is no significant linear relationship between the severity of the

issues and the time taken to resolve them.

Chart 1.1

The Calculation is performed on Excel Pivot worksheet starting from cell A104.

Corelation Between Severity and Avg Resolution Time

5.00

3.75

2.50

1.25

0.00

1 2

3

Severity Level

4

5

Average Resolution Time for Severity

Severity Flag

Avg Resolution Time

### How many categorical columns are there in the data? [Search about categorical and continuous data, and try to answer this question]

Data Type Classification:

The dataset comprises 12 categorical columns and 3 continuous columns. Below is the detailed classification of each column:

### Categorical Columns:

* + ID Ticket
  + Fecha
  + Employee ID
  + Agent ID
  + Request Category
  + Issue Type
  + Severity
  + Priority
  + Full Name
  + Email
  + Month of Birth
  + Day of Birth

### Continuous Columns:

* + Resolution Time (Days)
  + Satisfaction Rate
  + Year of Birth
  + Total Count:
  + Categorical Columns: 12
  + Continuous Columns: 3

# Subjective Question:

### If there is an investment, should it be used to hire more IT agents, improve training programs, or upgrade ticket management software?

**Analysis: Perform a cost-benefit analysis using ticket resolution and satisfaction metrics.**

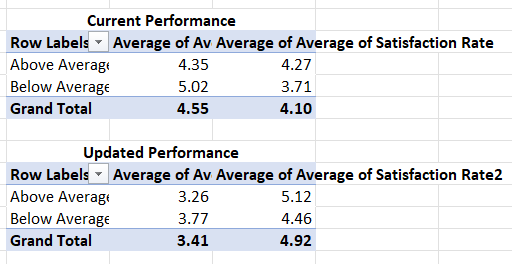
Referring to excel worksheet Performance, where the current performance of agents is shown in table which shows Average Resolution Time per Agent and Average Satisfaction Rating of employee. In the Table we also get to know the count of tickets handled by the agent over the time.

By using IF formula we derived the agent who is performing above average and below average for understanding the count of agent which are performing below average in the Employee Performance column.

As we don’t have data of investment, we have assumed the improvement in inefficiency and improvement in satisfaction rating which is given in below Table.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Investment Options** | **Cost Estimate** | **Time Saved/Improvement** | **Satisfaction Improvement** | **Total Benefit** |
| **Hire More Agents** | Agent Salaries | 20% decrease in resolution time | 15% increase in satisfaction | Average Ticket Resolution Time will be 3.64 days from  4.55 & Average Satisfaction Rating will be 4.72 from 4.10 also Average Ticket Handling Count comes down to 1721 from 1951 |
| **Improve Training** | Training Costs | 15% decrease for low agents | 10% increase for low agents | Average Ticket Resolution Time of underperforming agent come down to 4.27 days from 5.02 & Average Satisfaction Rating became  4.08 from 3.71 also Average Ticket Handling Count comes down to 22057 from 29278 |
| **Upgrade Ticket Management** | Software Cost | 25% decrease in inefficiency | 20% increase in satisfaction | Average Ticket Resolution Time will be 3.41 days from  4.55 & Average Satisfaction Rating will be 4.92 from 4.10 |

Table 2.1



**Current Performance (Before Update):**

* Above Average employees have an average resolution time of 4.35 days, and Below Average employees have a significantly higher resolution time of 5.02 days. Their satisfaction rates are also lower for the Below Average category.
* Clearly, resolution time is an area that needs improvement for Below Average employees, with both performance and satisfaction being lower.

**Updated Performance (After Update):**

* Upgrading Ticket Management Software leads to a 25% decrease in inefficiency, resulting in an improvement in resolution time (down to 3.41 days) and a 20% increase in satisfaction (up to 4.92). This demonstrates the power of modernizing systems to streamline workflow and improve both speed and customer satisfaction.

**Key Insights:**

* The Updated Performance clearly demonstrates the largest improvement in resolution time and satisfaction after upgrading the software, especially when compared to the alternatives (hiring agents and training). The reduction in inefficiency directly enhances overall productivity, which is a key driver for improving customer experience.
* While hiring agents provides a significant reduction in resolution time, the improvement in efficiency due to better software tools is more impactful for all employees, not just the underperformers.
* The satisfaction rate also increases significantly with the software upgrade, showing that a more effective ticket management system benefits the entire team, leading to faster resolutions and better customer satisfaction scores.

**Why Upgrading Ticket Management Software is the Best Investment:**

* While hiring more agents and training employees are both beneficial, Upgrading the Ticket Management Software stands out because it offers:
* **Improved Efficiency Across the Board**: A 25% decrease in inefficiency is a considerable gain that can significantly speed up the resolution process. This is a long-term, scalable improvement that will help not only current staff but also new hires.
* **Scalable Results**: Unlike hiring more agents, which may require more long-term financial investment (such as salaries), upgrading software improves performance for all agents without needing more headcount. It’s a one-time investment that can lead to sustainable benefits.
* **Direct Impact on Customer Satisfaction**: With a 20% increase in satisfaction, it directly contributes to better customer experiences, reducing the need for follow-ups or dissatisfaction due to slower resolutions

### Which agents need additional training based on their performance metrics?

**Analysis: Identify agents with the lowest satisfaction ratings and longest resolution times.**

Referring to the Performance worksheet, after filtering the red-colored cells for Average Resolution Time (highest) and Average Satisfaction Rating (lowest), we identify the following agents with below-average performance:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Agent ID** | **Count of ID Ticket** | **Average of Resolution Time (Days)** | **Average of Satisfaction Rate** | **Employee Performance** |
| 3 | 2021 | 5.38 | 3.62 | Below Average |
| 6 | 1949 | 5.32 | 3.59 | Below Average |
| 22 | 1966 | 5.51 | 3.63 | Below Average |
| 28 | 1946 | 5.41 | 3.61 | Below Average |

Table 2.2

These agents exhibit high resolution times and low satisfaction ratings, indicating a need for additional training to improve both efficiency and customer satisfaction.

### Do certain categories of requests have longer resolution times? Analysis: Analyze the resolution times by request category.

Applying Pivot and using category in Rows and Resolution Time in values as average we got below table.

|  |  |
| --- | --- |
| **Category** | **Average of Resolution Time (Days)** |
| Hardware | 7.63 |
| Login Access | 0.31 |
| Software | 5.24 |
| System | 6.62 |
| **Grand Total** | **4.55** |

Table 2.3

**Insights:**

1.**Hardware Requests** have the highest average resolution time at 7.63 days. This suggests that issues related to hardware may require more complex solutions, potentially involving external vendors or replacement of physical parts, leading to longer resolution times.

2.**Login Access** Requests have the shortest resolution time at **0.31** days. This is likely because such issues can often be resolved quickly, such as resetting passwords or providing immediate access rights, which does not require extensive troubleshooting.

3.**Software and System** related requests also show relatively long resolution times, at **5.24** days and **6.62** days, respectively. These categories may involve more intricate issues, such as troubleshooting software bugs or system performance problems, which can take more time to resolve.

4.The **Grand Total** resolution time of **4.55** days is an average across all categories, indicating that most requests are resolved in a moderate amount of time, but the variation between categories suggests that certain types of requests inherently require more time than others.

**Recommendations:**

**1.Allocate Resources to Hardware Issues:**

* Hardware requests have the longest resolution time, and you may want to allocate more resources (technical expertise, faster procurement processes, etc.) to address these requests more efficiently.
* Consider outsourcing hardware-related repairs or establishing quicker vendor relationships to reduce the resolution time.

**2.Streamline Login Access Requests:**

* Since Login Access requests are resolved quickly, it’s essential to maintain an efficient process to continue addressing them promptly. Consider automating certain aspects of this process, such as automated password resets or identity verification, to save time for more complex requests.

**3.Improve Processes for Software and System Issues:**

* For Software and System related issues, which also show moderate resolution times, ensure that agents are well-equipped with troubleshooting tools and comprehensive guides to quickly resolve issues.
* If specific software or system issues are recurring, consider setting up a dedicated troubleshooting knowledge base or offering specialized training to agents in those areas.

**4.Prioritize High-Resolution Categories:**

* Consider using SLA (Service Level Agreements) to ensure that more time-consuming categories (like hardware) are given priority. For example, tickets categorized under Hardware may be escalated or given an expedited resolution timeline to minimize customer wait times.

**5.Continuous Monitoring and Process Improvement:**

* Regularly monitor the resolution times for each category and look for patterns. If certain categories consistently show longer resolution times, investigate whether there are specific bottlenecks (e.g., hardware suppliers, system downtime) that need to be addressed.
* Gather feedback from agents to understand where improvements could be made in the ticket resolution process (e.g., training, tools, or internal communication).

**6.Automation for Repetitive Tasks:**

* If any categories, such as Login Access, show recurring simple tasks, consider implementing automation to further reduce resolution time. This would free up time for agents to focus on more complex requests.

**Conclusion:**

From the analysis, it is clear that hardware-related issues take significantly longer to resolve than other categories, while login access issues are resolved almost immediately. By focusing on improving resources and processes for hardware requests, while maintaining efficiency in categories like login access, you can optimize resolution times across the board.

### How effective are the current software tools in managing IT tickets? Analysis: Evaluate performance metrics before and after the implementation of new tools.

Referring to the Performance worksheet,

As we don’t have actual data post-implementation, we assume the new tool decreases inefficiency by 25% and increases the satisfaction rating by 20%, as stated in Subjective Question 1. Based on these assumptions, the data is as follows:

|  |  |  |  |
| --- | --- | --- | --- |
| **Old Average of Resolution Time (Days)** | **Old Average of Satisfaction Rate** | **New Resolution Time (25% Assumption)** | **New Average satisfaction rate (20% Assumption)** |
| 4.55 | 4.10 | 3.41 | 4.92 |

Table 2.4

This indicates that with the new tool, the Average Resolution Time will decrease to 3.41 days from 4.55 days, and the Average Satisfaction Rating will increase to 4.92 from 4.10

To evaluate the current tools’ effectiveness in more detail, we analyzed the performance data by Severity and Priority.

**Severity Insights:**

**1.Urgent Tickets:**

* Resolution Time: Fastest among all severities (2.00 days).
* Satisfaction Rate: High at 4.12.
* Insight: Current tools are effective for handling critical tickets quickly and ensuring user satisfaction.

**2.Normal Tickets:**

* Resolution Time: The slowest at 4.66 days, likely due to high ticket volumes.
* Satisfaction Rate: Relatively lower at 4.10.
* Insight: Delays in resolving high-volume, medium-criticality tickets reveal inefficiencies.

**3.Minor and Major Tickets:**

* Resolution Time: Moderate at 3.44 (Minor) and 3.91 (Major).
* Satisfaction Rate: Consistent with overall trends (~4.07–4.12).
* Insight: Some room for optimization exists for non-critical tickets.

**Priority Insights:**

1. **High Priority Tickets:**

* Resolution Time: Best performance overall (e.g., High Priority within Urgent: 0.55 days).
* Insight: Strong prioritization capability for urgent tasks.

1. **Low Priority Tickets:**

* Resolution Time: Prolonged delays, e.g., Low Priority for Normal (6.13 days).
* Insight: Tools appear to deprioritize low-priority tickets excessively, potentially causing inefficiencies for routine requests.

**Insights Based on Analysis:**

**Current Strengths:**

* The tools excel at resolving High Priority and Urgent Severity tickets, ensuring user satisfaction for time-critical issues.

**Identified Gaps:**

* Resolution Delays for Normal Severity Tickets: High volume and medium priority seem to challenge the system’s efficiency.
* Low Priority Tickets: Tools appear to underperform for low-priority requests, leading to longer resolution times.

Recommendations:

**Optimize Resource Allocation:**

* Shift more resources toward handling Normal Severity and Low Priority tickets during non-peak periods.

**Automate Processes for Routine Tickets:**

* Implement automation tools to streamline responses for Low Priority and Normal Severity tickets, reducing human intervention.

**Dynamic Prioritization:**

* Use data-driven approaches to reprioritize tickets dynamically based on real-time metrics like volume and SLA adherence.

**Transparency and Feedback Loops:**

* Introduce better tracking tools to inform users about delays for low-priority requests and collect regular feedback to identify bottlenecks.

**Periodic Tool Evaluation:**

* Conduct biannual reviews of the ticket management tools' performance across all severity and priority levels to ensure ongoing optimization.

**Additional Employee Training:**

* Focus on training IT staff to use existing tools more effectively for mid-level severity and low-priority cases.

**Conclusion:**

* The current software tools effectively manage Urgent Severity and High Priority tickets, as seen in their fast resolution times and high satisfaction rates. However, there is room for improvement in handling Normal Severity and Low Priority tickets. By addressing inefficiencies and implementing the recommendations above, the organization can achieve better overall performance and user satisfaction.

1. **How has the performance of the IT support team changed over time (e.g.,**

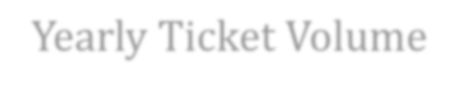
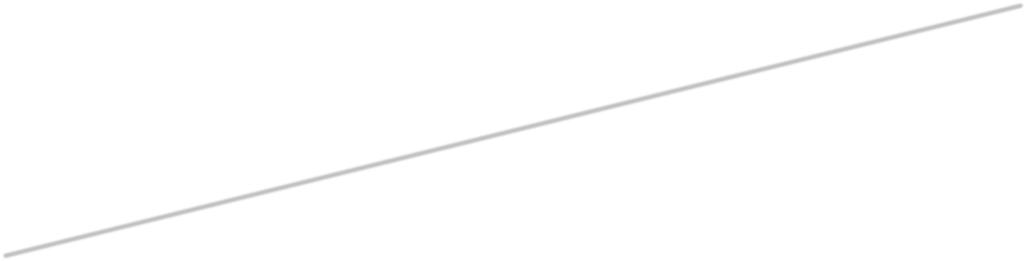
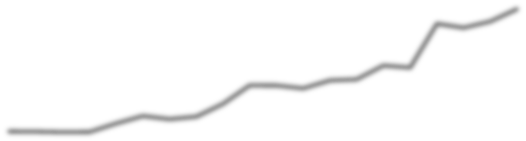
**monthly or quarterly)?**

**Analysis: Trend analysis using time series charts.**

Below is the chart which shows the trend of Tickets over quarters.

Count of Tickets

Chart 2.1



Yearly Ticket Volume

10000

8000

6000

4000

2000

0

2016

2017

2018

Years/ Quaters

2019

2020

As per chart we can see that the count of tickets is stable in year 2016 in all quarters. Moving towards year 2017 is shows increasing over the next four years. But there is a steep rise in count in quarter 1 of year 2020.

### If we invest more on tech (Hardware, software, etc), do you think it will improve the ticket resolution times and employee satisfaction? Analysis: Use historical data to project potential improvements.

Assuming the values as per below table, we will get the result.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Category** | **Count of ID Ticket** | **Average of Resolution Time (Days)** | **Average of Satisfaction Rate** | **Assuming Decrease in Inefficiency** | **Assuming Increase in employee satisfaction** | **Average of Resolution Time (Days)** | **Average of Satisfaction Rate** |
| Hardware | 9733 | 7.63 | 4.10 | 25% | 10% | 5.72 | 4.51 |
| Login Access | 29193 | 0.31 | 4.09 | 10% | 15% | 0.28 | 4.71 |
| Software | 19570 | 5.24 | 4.11 | 20% | 15% | 4.19 | 4.72 |
| System | 39002 | 6.62 | 4.10 | 20% | 10% | 5.29 | 4.51 |
| **Grand Total** | **97498** | **4.55** | **4.10** |  |  | **3.87** | **4.61** |

Table 2.5

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Investment Options** | **Cost Estimate** | **Time Saved/Improvement** | **Satisfaction Improvement** | **Total Benefit** |
| **Hardware** | Hardware Costs (Computers, Laptops, Server, etc) | 25% decrease in resolution | 10% increase in satisfaction | Average Ticket Resolution Time will be 5.72 days from  7.63 & Average Satisfaction Rating will be 4.51 from 4.10 |
| **Software** | Software Update Cost (License, Subscriptions) | 20% decrease for low  agents | 15% increase  for low agents | Average Ticket Resolution Time of underperforming agent come down to 4.19 days from 5.24 & Average Satisfaction Rating became  4.72 from 4.11 |
| **System** | System Upgrade Cost (Servers, Network) | 20% decrease in inefficiency | 10% increase in satisfaction | Average Ticket Resolution Time will be 5.29 days from  6.62 & Average Satisfaction Rating will be 4.51 from 4.10 |

Table 2.6

If we invest more on Hardware category, we will be having more benefits for achieving lesser average resolution time and greater average satisfaction rate.

### What are the key performance metrics for IT agents, and how can they be improved, do we need to fire any agents?

**Analysis: Define and analyze metrics such as average handling time, satisfaction scores, and number of tickets resolved.**

Key Performance Metrics for IT Agent are:

* + Average Ticket Handling Time per Agent
  + Average Satisfaction Rating per Agent
  + Number of Tickets Resolved per Agent
  + Performance Score based in Time and Rating

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Agent ID** | **Count of ID Ticket** | **Average of Resolution Time (Days)** | **Average of Satisfaction Rate** | **Employee Performance** |
| 3 | 2021 | 5.38 | 3.62 | Below Average |
| 6 | 1949 | 5.32 | 3.59 | Below Average |
| 22 | 1966 | 5.51 | 3.63 | Below Average |
| 28 | 1946 | 5.41 | 3.61 | Below Average |

Table 2.7

Referring to the "Performance" worksheet, the following steps and references

were used to identify underperforming agents:

**1. Conditional Formatting Reference:**

* + - Highlighted agents with high average resolution times (red formatting) and low satisfaction ratings (red formatting).
    - Filtered columns "Average of Resolution Time" and "Average of Satisfaction Rate" to identify problematic agents.

**2. Category-Specific Reference (From Subjective Question 3):**

* Some categories inherently require longer resolution times (e.g., Hardware: 7.63 days, Software: 5.24 days).
* Agents working on these categories may need to be evaluated differently.

**3. Severity and Priority Reference (From Subjective Question 4):**

* Higher severity and priority tickets (e.g., "Urgent" or "Major") often involve complex issues, impacting resolution times and satisfaction.
* Metrics should be adjusted to account for these factors to ensure fair performance evaluation.

**4. Performance Benchmark Reference (From Subjective Question 1):**

* After implementing new tools, a 25% reduction in resolution times and a 20% increase in satisfaction are expected. These benchmarks should be used as targets for improvement.

**Recommendations:**

**1. Training Programs:**

* Provide targeted training to underperforming agents on time management and customer service.
* Focus on specific categories where they show weaknesses.

**2. Performance Monitoring:**

* Use dashboards to monitor agents' performance over time.
* Regularly review metrics to ensure alignment with organizational goals.

**3. Support Systems:**

* Equip agents with better tools and resources to manage tickets more efficiently.

**4. Improvement Plans:**

* For agents with "Below Average" performance, implement improvement plans with measurable targets.
* If no improvement is observed after sufficient training and support, consider termination as a last resort.

**Conclusion:**

* The analysis, supported by data from the "Performance" worksheet and insights from earlier questions (3 and 4), highlights specific agents and metrics requiring attention. By addressing these issues through training, monitoring, and improved tools, the overall performance of IT agents can be enhanced without prematurely resorting to termination.

1. **How do employee demographics (e.g., department, seniority) impact satisfaction and ticket outcomes?**

**Analysis: Segment analysis using filters and pivot tables.**

**With reference to demographic worksheet**

This analysis examines the impact of agent age on ticket outcomes, specifically focusing on ticket volume, average satisfaction rate, and average resolution time. The data reveals that age does not significantly influence satisfaction or resolution time, suggesting other factors play a larger role in determining outcomes.

**Insights**

**1. Ticket Volume by Age**

* The distribution of ticket volume across age groups shows that agents aged 40-42 and 43-45 handle the highest number of tickets, with 17,486 and 17,581 tickets respectively.
* The 46-48 age group has the lowest ticket volume (3,885), followed by the 52-54 age group (5,895).

**2. Average Satisfaction Rate by Age**

* Satisfaction rates remain relatively consistent across age groups, with the highest satisfaction observed in agents aged 52-54 (4.41).
* Slight dips in satisfaction are noted for the 34-36 age group (3.64) and 40-42 age group (3.94).

**3. Average Resolution Time by Age**

* Resolution times are consistent across most age groups, averaging 4-5 days.
* There are no significant deviations in resolution time, indicating uniformity in performance.

**Recommendations**

**1. Investigate Satisfaction Trends**

* The 34-36 age group shows a notably lower satisfaction rate (3.64). Further investigation is needed to identify contributing factors, such as ticket complexity, workload, or training needs.

**2. Focus on Operational Metrics**

* Since resolution time and satisfaction rates are not significantly impacted by age, prioritize analyzing operational factors such as:
* Ticket priority and severity.
* Complexity of tickets handled by each age group.
* Tools and resources available to agents.

**3. Role-Specific Interventions**

* Develop training programs tailored to specific roles or departments rather than age groups, as age does not directly influence resolution efficiency or satisfaction rates.

**4. Enhance Demographic Analysis**

* Expand the scope of analysis to include other demographic factors such as department, job role, and seniority. This can provide a more comprehensive understanding of performance variations.

**5. Regular Monitoring**

* Periodically review demographic metrics alongside operational data to ensure consistency and identify emerging patterns over time.

**Supporting Charts**

**Chart 1: Count of Tickets by Age**

* Chart Type: Bar Chart.
* Purpose: Displays ticket volume handled by each age group.
* Key Insight: Highlights the age groups managing the highest and lowest ticket volumes.

**Chart 2: Average Satisfaction Rate by Age**

* Chart Type: Line Chart.
* Purpose: Visualizes satisfaction trends across age groups.
* Key Insight: Identifies age groups with higher or lower satisfaction rates.

**Chart 3: Average Resolution Time by Age**

* Chart Type: Line Chart.
* Purpose: Illustrates resolution time consistency across age groups.
* Key Insight: Confirms that resolution time is not significantly influenced by age.

**Conclusion**

* The analysis confirms that agent age does not significantly impact satisfaction

rates or resolution times. Instead, operational metrics and factors like ticket complexity or resource availability likely play a larger role. By focusing on these areas and regularly monitoring performance data, organizations can further

improve efficiency and customer satisfaction.

1. **Identify the trends for IT support operations based on ticket volumes and**

**satisfaction, and mention the peak and stable times?**

**Analysis: Use pivot tables and charts to identify peak and off-peak hours.**

With reference to pivot worksheet, in subjective 9

Chart 2.3

Count of Tickets

**Insights:**

**1.Ticket Volume Trends:**

* 2016: The ticket volumes were stable across all quarters, indicating a steady inflow of support requests.
* 2017-2019: There was a gradual increase in ticket volumes year-over-year, especially during Q2 and Q3, suggesting a seasonal trend where ticket inflows peak during these quarters.
* 2020: A significant spike in ticket volumes is observed in Q1, followed by consistently high volumes in subsequent quarters, likely due to external factors such as a shift in business operations (e.g., remote work during the pandemic).

**2. Satisfaction Trends:**

* The average satisfaction rate (blue bars) shows a slight decline from 2016 to 2018, indicating potential dissatisfaction among users despite the steady or increasing ticket volumes.
* From 2019 onward, the satisfaction rate shows a steady improvement, which may be attributed to better handling of tickets, implementation of new tools, or enhanced support processes.
* There’s a strong positive trend in satisfaction during Q4 2019 to Q4 2020, even with the increasing ticket volumes, which highlights effective management during high-demand periods.

**3.Correlation Between Ticket Volumes and Satisfaction:**

* Generally, as ticket volumes increased (2017-2018), satisfaction slightly dropped, implying that the IT team may have been overwhelmed during these periods.
* However, post-2019, even with high ticket volumes, satisfaction improved, suggesting better resource allocation or improvements in agent efficiency and tools.

**Recommendations:**

**1.Resource Planning for Peak Periods:**

* Since ticket volumes tend to peak during Q2 and Q3, ensure adequate staffing and resources during these quarters to maintain customer satisfaction.
* Consider using predictive models to forecast ticket inflows based on historical data and prepare accordingly.

**2.Training Programs:**

* Focus on continuous training for IT agents, especially during periods of increasing ticket volumes. This can help maintain the upward trend in satisfaction.
* Tailor training programs to specific problem areas (e.g., categories with the highest dissatisfaction rates).

**3.Improved Tools and Processes:**

* Ensure agents are equipped with efficient tools to handle higher ticket volumes during peak periods.
* Automate routine ticket handling to free up agents for more complex issues, further improving satisfaction rates.

**4.Feedback Mechanisms:**

* Analyze dissatisfaction trends in earlier periods (2016-2018) to identify underlying issues and prevent similar problems in the future.
* Regularly collect feedback from customers post-resolution to monitor agent performance and satisfaction levels.

**5.Continued Monitoring:**

* Build a real-time dashboard to track ticket volumes and satisfaction rates together, helping identify problem areas as they arise.
* Ensure the metrics are reviewed quarterly to align with seasonal variations in ticket inflow.

**6.Prioritize High-Impact Periods:**

* Allocate more resources during periods of rapid ticket inflow, such as Q1 2020, where a spike was observed. This will help mitigate the risk of decreased satisfaction due to delayed resolutions.

By implementing these recommendations, the IT support team can ensure continued improvement in satisfaction rates while efficiently managing the growing ticket volumes.

1. **What metrics should be included in the final dashboard to provide a comprehensive view of call center performance and guide investment decisions?**

**Following are the Metrics should be included for making dashboard of call center performance and guide investment decision:**

1. **Call Volume Metrics**
   * Total Calls Received: Number of incoming calls over a specific period.
   * Average Calls per Hour/Day: Understanding peak hours for staffing purposes.
   * Abandonment Rate: Percentage of calls that are abandoned before reaching an agent.

### Performance Metrics

* + Average Handling Time (AHT): Average time taken to resolve a call, including talk time and after-call work.
  + First Call Resolution (FCR) Rate: Percentage of calls resolved on the first contact without the need for follow-up.
  + Service Level (SL): Percentage of calls answered within a specified timeframe

(e.g., 80% of calls answered within 30 seconds).

### Agent Performance Metrics

* + Average Speed of Answer (ASA): Average time taken to answer incoming calls.
  + Agent Utilization Rate: Percentage of time agents spend handling calls compared to their total available time.
  + Agent Satisfaction Scores: Feedback collected from agents to assess morale and job satisfaction.

### Customer Satisfaction Metrics

* + Customer Satisfaction Score (CSAT): Survey-based score assessing customer

satisfaction after a call.

* + Net Promoter Score (NPS): Measures customer loyalty and likelihood to recommend the service.
  + Customer Effort Score (CES): Measures the ease of interaction with the call centre.

### Operational Metrics

* + Ticket Volume: If applicable, the number of support tickets generated from calls.
  + Resolution Time: Average time taken to resolve tickets generated from calls.
  + Escalation Rate: Percentage of calls that need to be escalated to higher-level support.

### Cost Metrics

* + Cost per Call: Average cost incurred to handle a call, including agent costs and operational expenses.
  + ROI on Training Programs: Measure the impact of training initiatives on performance metrics.

### Trends and Forecasting

* + Trends Over Time: Monthly or quarterly trends for all key metrics to visualize growth or decline.
  + Forecasting: Predictions based on historical data to help anticipate staffing needs and budget allocations.

### Workforce Management Metrics

* + Schedule Adherence: Percentage of time agents are available to take calls

compared to their scheduled time.

* + Training Hours per Agent: Amount of training received by agents over a specified period.