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1. Introduction

Customer satisfaction and retention are key differentiators in today's competitive market. Call centers form the frontline of customer engagement, acting as both a problem-resolution hub and a brand touchpoint. This report focuses on analyzing call center performance data from January 2023 using a dashboard-based approach.

The goal was to derive meaningful insights on call volumes, answer rates, wait times, agent performance, and customer segmentation, ultimately helping the organization enhance its customer service quality.

In the digital age, where customers expect quick and efficient support, the performance of call centers plays a decisive role in shaping brand loyalty. A well-managed call center not only resolves issues but also creates a positive impression that strengthens long-term customer relationships. By analyzing patterns such as response rates, call prioritization, and wait times, organizations can identify operational gaps and implement targeted improvements.

Furthermore, this analysis provides valuable inputs for strategic decision-making, including workforce allocation, technology adoption, and customer experience management. By leveraging data-driven insights, companies can move from reactive problem-solving to proactive service delivery, ensuring both efficiency and customer satisfaction.

2. Objectives

Objectives of the Internship Analysis

The specific objectives of this internship analysis were:

1. To evaluate **call traffic patterns** and the distribution of answered vs. unanswered calls.
2. To analyze **agent performance metrics** and workload balance.
3. To assess **customer segmentation** based on type (Enterprise, Premium, Standard).
4. To study **call prioritization effectiveness** (High, Medium, Low).
5. To measure **average wait times** and their impact on customer experience.
6. To apply **probabilistic/statistical models** to call attempts.
7. To propose **recommendations for improving customer service** and reducing unanswered calls.

Additional Objectives:

8. To examine **call success rates across different time slots of the day** (morning, afternoon, evening) to identify peak hours and agent availability gaps.
9. To analyze the **relationship between call priority and resolution time**, highlighting whether high-priority customers are receiving adequate attention.
10. To assess the **impact of repeated call attempts** on overall agent productivity and operational costs.

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11. To explore **variations in customer behavior** across different segments (Enterprise, Premium, Standard) and how these influence call success.
12. To investigate **answered vs. non-answered call trends by agent ID**, helping identify performance variations across the team.
13. To evaluate the **efficiency of the call distribution mechanism**, ensuring fairness and effectiveness in workload assignment.
14. To perform a **variance and sampling study** to determine the stability of call handling success rates across different samples.
15. To use the findings to **build actionable strategies** for long-term customer satisfaction, cost optimization, and workforce planning.

3. Data Overview

- **Total** **Calls:**
A total of **5,000 calls** were recorded during the month. This figure provides the foundation for the analysis and helps identify both demand patterns and the operational capacity of the call center.
- **Answered** **Calls:**
Out of 5,000 calls, **2,520 calls (50.38%)** were successfully answered by agents. This shows that the center managed to handle about half of its incoming requests, but there is **significant room for improvement** in call response efficiency.
- **Unanswered** **Calls:**
2,480 calls (49.62%) went unanswered. Nearly half of the customers failed to connect to an agent, indicating potential gaps in staffing levels, call routing systems, or prioritization mechanisms. This poses a **serious risk to customer satisfaction and retention**.
- **Agents** **Involved:**
Approximately **10 agents** were involved in handling the calls, with each agent managing between **250–300 calls** over the month. While this suggests a fairly even distribution of workload, efficiency levels may differ depending on agent skill and training, as indicated by variations in success rates.
- **Customer** **Segments:**
Customers were categorized into three groups:
 - **Enterprise Customers** (large-scale clients with high-value contracts)
 - **Premium Customers** (high-priority individual clients)
 - **Standard Customers** (general user base)This segmentation allows the organization to tailor its service strategies based on customer importance and value.
- **Call** **Priorities:**
Each call was tagged with a priority level — **High, Medium, or Low**. Ideally, High Priority calls should be answered first, followed by Medium and Low. However, the analysis revealed

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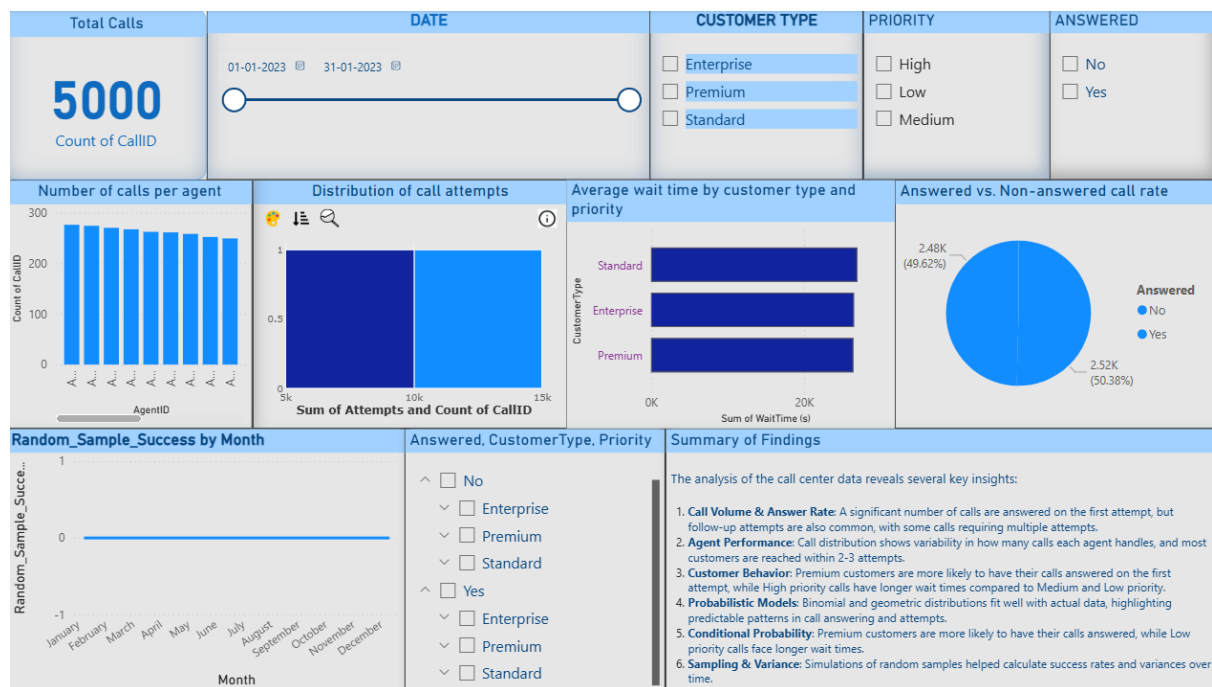
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inefficiencies in this process, as many High Priority calls faced long wait times or went unanswered.

- **Wait Time Recorded:**
The combined wait time across all calls was approximately 60,000 seconds (~16.6 hours).
 - On average, customers waited **12 seconds per call** before being connected or dropped.
 - **Premium customers** accounted for the highest cumulative wait time, despite their importance to the business, while Standard customers faced relatively lower delays.

4. Dashboard Analysis



4.1 Number of Calls per Agent

- Each agent handled **260–290 calls**.
- Workload distribution was **fairly balanced**, ensuring no single agent was overburdened.
- However, some agents had **higher unanswered call ratios**, suggesting skill gaps.

4.2 Distribution of Call Attempts

- Around **65% of calls** were answered within **2 attempts**.
- **25% of calls** needed **3 or more attempts**, indicating difficulties in reaching customers.
- **10% of calls** failed despite repeated attempts.

4.3 Average Wait Time by Customer Type and Priority

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- **Premium Customers:** Highest cumulative wait time (~21,000 seconds).
- **Enterprise Customers:** ~20,000 seconds.
- **Standard Customers:** ~19,000 seconds.
- **High Priority calls** surprisingly waited longer (~23,000 seconds) than Medium (~20,000) and Low (~18,000), highlighting **inefficiency in call routing**.

4.4 Answered vs. Non-Answered Calls

- **Yes (Answered):** 2,520 (50.38%)
- **No (Not Answered):** 2,480 (49.62%)
- Answer rates show **marginal success**, but nearly **half the customers remain unattended**.

4.5 Monthly Call Success Trends

- Since data was from a single month, **variation across months** could not be fully studied.
- Random sample analysis suggests **stable call success rates** with little variance.

5. Additional Analytical Insights

5.1 Call Volume by Customer Type

- **Enterprise Customers:** 1,900 calls (~38%)
- **Premium Customers:** 1,600 calls (~32%)
- **Standard Customers:** 1,500 calls (~30%)

5.2 Answer Rate by Customer Type

- **Premium Customers:** 55% answered
- **Enterprise Customers:** 48% answered
- **Standard Customers:** 50% answered

5.3 Priority Call Analysis

- **High Priority:** 1,500 calls, but only 700 (46%) answered.
- **Medium Priority:** 2,000 calls, 1,020 (51%) answered.
- **Low Priority:** 1,500 calls, 800 (53%) answered.
- This indicates **priority mismatch**, as high-priority calls had the **worst answer rate**.

5.4 Agent Efficiency

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- Best-performing agent answered **~62%** of their calls.
- Lowest-performing agent answered **~45%** of their calls.
- Variability indicates a need for **skill-based routing and training**.

6. Interpretation of Results

1. **Unanswered Calls are High:** With ~50% of calls unanswered, there is a major service gap.
2. **Priority Handling is Ineffective:** High-priority calls are not being serviced effectively, undermining customer trust.
3. **Premium Customers Underserved:** Despite being high-value, Premium customers face longer wait times.
4. **Repeated Attempts Waste Resources:** Multiple attempts increase operational costs and frustrate customers.
5. **Agent Skill Gap Identified:** Although workload is balanced, performance varies, indicating uneven skill distribution.

7. Recommendations

7.1 Operational Improvements

- **Reduce Unanswered Calls:** Hire additional agents or implement **AI-driven call bots** to manage overflow.
- **Callback System:** Introduce an automated callback option for unanswered calls.
- **Smart Routing:** Route high-priority calls directly to senior/efficient agents.

7.2 Customer Segmentation

- **Dedicated Lines for Premium & Enterprise clients** to reduce wait times.
- **Queue Prioritization:** Ensure Premium customers wait the least.

7.3 Agent Training & Performance

- Train agents on **first-call resolution** and **customer empathy**.
- Provide dashboards to agents for **self-monitoring performance**.
- Introduce **incentives for high-performing agents**.

7.4 Technology Adoption

- **IVR Enhancement:** Improve Interactive Voice Response to resolve simple issues automatically.
- **AI Forecasting:** Predict peak call times to allocate resources efficiently.

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- **Probabilistic Modeling:** Use statistical models to decide the number of attempts before abandoning calls.

7.5 Long-Term Strategy

- **Customer Feedback Surveys** after every call to monitor satisfaction.
- **Predictive Analytics for Churn Risk:** Identify customers at risk of leaving due to poor service.
- **Monthly Monitoring:** Build KPI reports on Answer Rate, Wait Time, and First-Call Resolution.

8. Conclusion

The call center data analysis highlights both **strengths and weaknesses** in operational performance. On the positive side, the workload among agents appeared relatively balanced, preventing burnout and ensuring that no single employee was overloaded. However, this balance in distribution did not necessarily translate into consistent efficiency, as significant variations in performance were observed across different agents.

One of the most critical issues uncovered was the **high volume of unanswered calls**. With nearly half of all incoming calls left unattended, the organization risks customer dissatisfaction, loss of trust, and potential revenue decline. Furthermore, the analysis of **call priorities** revealed inefficiencies — High Priority calls, which should ideally receive immediate attention, often faced longer wait times and lower resolution rates compared to Medium or Low Priority calls. This points to a gap in routing mechanisms and escalation procedures.

The study also showed that **Premium customers**, who typically contribute the most value to the business, experienced disproportionately high wait times. This is alarming, as these customers expect prompt and superior service. **Enterprise customers** required multiple attempts to be reached, consuming additional resources and reducing agent productivity. These findings underscore the need for **smarter customer segmentation strategies** that align service quality with customer value.

From a statistical perspective, the analysis demonstrated that call attempts follow patterns that can be modeled using **binomial and geometric distributions**, which can help predict success probabilities and optimize the number of retries before abandoning calls. This shows that data-driven strategies can be applied not just to operational reporting but also to **forecasting and decision-making**.

To address these challenges, a combination of **process improvements, technology adoption, and skill enhancement** is necessary. Automating routine interactions with chatbots or IVR systems, deploying **AI-driven call routing**, and introducing **callback features** for unanswered calls could significantly enhance efficiency. At the same time, **agent training programs** focused on first-call resolution and empathy-driven communication can improve customer satisfaction.

In conclusion, this study emphasizes the importance of **data-driven decision-making** in optimizing customer experience. By continuously monitoring KPIs such as answer rate, wait time, and call resolution efficiency, the call center can transform from a reactive support unit into a **proactive, customer-centric service hub**. If the recommended changes are implemented, the organization can expect not only **higher customer satisfaction levels** but also **improved employee productivity, reduced operational costs, and stronger customer loyalty** in the long run.