Enhancing Operational Efficiency and Employee Retention for Sustained Growth in HSK Enterprises Firm

A MidTerm Report for the BDM Capstone Project

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Executive Summary

This project addresses critical operational and employee challenges at **HSK Enterprises**, a service firm based in Shalimar Bagh, Delhi, specializing in providing printers to various B2B sectors. The company, with an annual turnover of 36 lakh rupees, faces significant issues including high employee turnover due to dissatisfaction with salary, overtime, and travel demands, coupled with inefficiencies stemming from manual data management.

In this report, we have done analysis, based on six months of detailed customer and employee data, employed descriptive statistics, trend analysis, and correlation studies to uncover key patterns and insights. The findings reveal the need for improved digital tools to enhance data management, employee satisfaction, and overall operational efficiency.

Action Plan and Timeline:

- *July to August*: I'm helping in facilitating the company's transition to a stronger online presence, including setting up a *LinkedIn profile* to boost visibility and business engagement.
- *August to September:* I'm developing and deploy an automated billing script to integrate with the company's existing Excel data, ensuring a more accurate and efficient billing process.
- *August to September:* Work with the business owner to explore and potentially implement software for automatic printer readings, aiming to minimize manual intervention. *This initiative is contingent on ongoing discussions with a major MNC and may not be finalized.*

These steps are designed to address the core issues identified in our analysis, providing practical solutions to enhance operational processes and employee satisfaction. By implementing these recommendations, HSK Enterprises is expected to see improved profitability, streamlined operations, and overall business growth.

*Note: While analysing the business problem more deeply, the project expected timeline had to be changed expanding one more month making new expected timeline of (May-Sept).This will ensure more in-depth understanding of the business.

Proof of Originality of the Data

This section includes the data and project originality.

- **Video Proof:** Interview conducted with the business owner of HSK Enterprises. Google drive link for the video here.
- **Data Proof:** Necessary data was provided in a single data excel file with multiple sheets in it. Google drive link for the data can be found here.
- **Images and NOC Proof:** Images of the employees working on client sites on thier rental

machines (including image of the owner too). Google drive link for the images [here](). And the NOC Letter given by the business can be found [here]().

- **Email from the Enterprises Proof:**
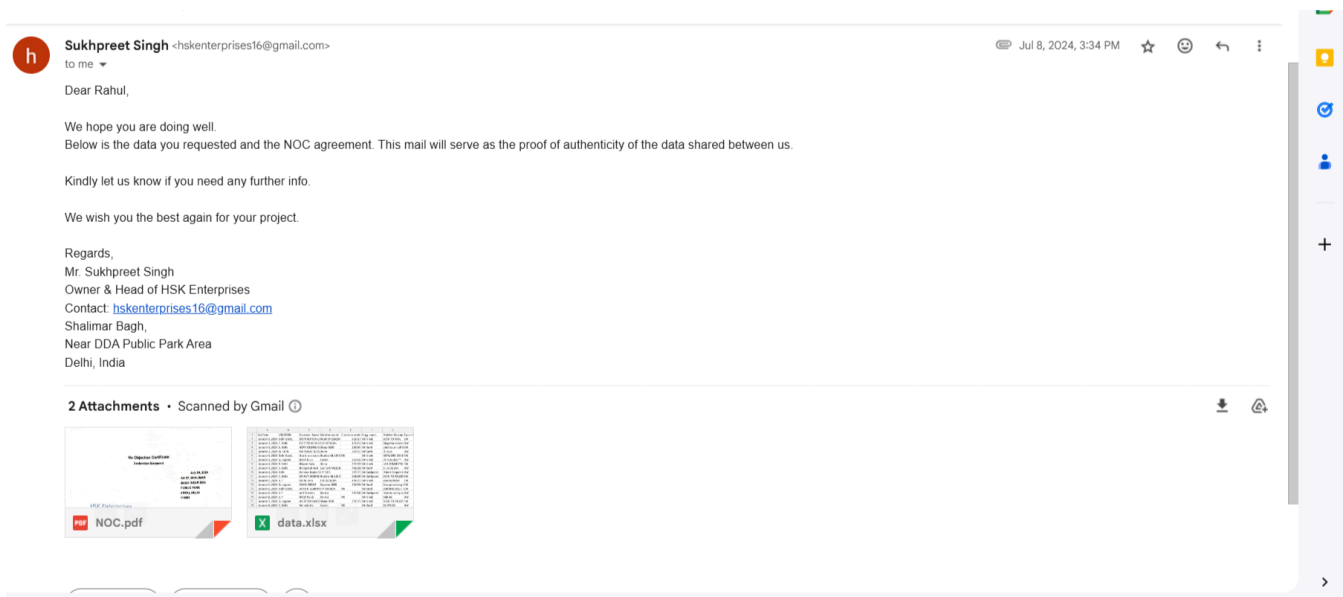
Google drive link for <u>complete mid term</u> required documents can be found [here]().

MetaData

- **Data Sourcing:** The data for this project comprises two key datasets: customer data and employee data from HSK Enterprises. The data was sourced from the business owner's accountant and authenticated by the business owner, Mr. Sukhpreet Singh. This ensures the accuracy and credibility of the collected information.

- **Data Scope:** The customer data spans from January 2024 to June 2024, while the employee data covers the period from January 2020 to July 2024. The records were originally documented in manual books, Excel sheets, and Tally ERP, an online enterprise resource planning software. This varied sourcing of data necessitated careful consolidation and standardization for accurate analysis.

- **Data Description and Size:** The customer dataset includes approximately 70 rows of data per month, detailing interactions with clients, machine models, issues reported, resolutions, and support modes. The employee dataset contains 14 rows, detailing information such as employee names, positions, hiring and departure dates, salaries, perks, performance ratings, training status, assigned areas, and travel logs.

Initial examination revealed inconsistencies and missing values in the raw data. To address these issues, missing values were imputed using mean values for the data columns. The 'Problem Description' column exhibited significant variability and included personal information that the business owner opted not to disclose. Consequently, a preprocessing phase was conducted using Python libraries (including scikit-learn, pandas, and Sentence Transformers) to normalize and standardize the problem descriptions. This preprocessing was crucial for ensuring that the data was suitable for subsequent analysis and for enhancing the accuracy of the patterns and trends identified.

Analysis Methodology: The processed data was analyzed using a combination of descriptive statistics, trend analysis, and advanced machine learning techniques. These analyses aimed to identify key patterns, correlations, and insights that could inform actionable recommendations for improving operational efficiency and employee retention.

Customer Preprocessed Excel Data : link

Employee Preprocessed Excel Data : link

Colab Link for Analysis of Employee Preprocessed Data : link

Colab Link for Analysis of Customer Preprocessed Data : link

This comprehensive approach ensures that the data is both robust and reliable, providing a solid foundation for the analytical processes and final recommendations given.

Descriptive Statistics

- ## Starting with the first problem - Employee Retention

HSK Enterprises *Employee Data* (Jan'2020 - Jul'2024)

Data Entries: Employee name, Position, Date of Hiring(month/year), Date of Departure, Currently present, Reason for leaving, Salary offered (in Rs) perk benefits given, performance rating (out of 10), Training status, Assigned area, Travel log

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	Employee na	Position	Date of Hirin	Date of Depa	Currently pre	Reason for le	Salary offere	perk benefits	performance	Training stat	Assigned are	Travel log		
2	Vivek	Engineer	04/2023		Yes		40000	medical insuranc	8	Trained	Delhi	Assigned acc to availability or need		
3	Sunil Kumar	Engineer	04/2023		Yes		45000	medical insuranc	8	Trained	Delhi	Assigned acc to availability or need		
4	Ajay	Accountant	10/2023		Yes		40000	medical insuranc	8	Trained	Work from home			
5	Arif	Engineer	04/2022	03/2023	No	competitive sala	30000	medical insuranc	7	Trained	Delhi	Assigned acc to availability or need		
6	Harshit	Engineer	04/2022	06/2022	No	not sure	15000	medical insurance, travel expense		Under training				
7	Diljeet	Engineer	10/2022	10/2023	No	not happy with s	35000	medical insuranc	7.5	Trained	Delhi	Assigned acc to availability or need		
8	Arjun	Engineer	01/2022	03/2023	No	not happy with s	30000	medical insuranc	7	Trained	Delhi	Assigned acc to availability or need		
9	Hitesh	Technician	02/2022	11/2022	No	overtime and tra	25000	medical insuranc	8	Trained	Delhi	Assigned acc to availability or need		
10	Atul	Engineer	06/2022	05/2022	No	switched to othe	18000	medical insurance, travel expense		Under training				
11	Rohit	Engineer	08/2021	09/2022	No	not happy with s	25000	medical insuranc	7	Trained	Delhi	Assigned acc to availability or need		
12	Rajesh Kumar	Technician	05/2021	04/2022	No	not satisfied wit	28000	medical insuranc	8	Trained	Delhi	Assigned acc to availability or need		
13	Sunil Shah	Engineer	09/2020	07/2021	No	found a better o	29000	medical insuranc	7	Trained	Delhi	Assigned acc to availability or need		
14	Manish	Technician	01/2020	08/2021	No	better job offers	32000	medical insuranc	7.5	Trained	Delhi	Assigned acc to availability or need		
15	Sanjay	Engineer	03/2021	06/2021	No	personal reason:	25000	medical insuranc	6.5	Trained	Delhi	Assigned acc to availability or need		
16														
17														

Stats Overview:

Data Size: 14 rows*12 columns

Salary Statistics:

Mean	Median	Mode	Standard Deviation	Range
₹29785.71429	₹29500	₹25000	8331.391715	₹15000-₹45000

Performance Statistics:

Mean	Median	Mode	Standard Deviation	Range
7.45833	7.5	8	0.5418	6.5 - 8

Turnover Rate over the total given years: Current Employees : 3 Departed Employees : 11

Top Reason for Leaving: 'not happy with salary and overtime'

- ## Customer Data Descriptive Statistics

HSK Enterprises Customer Data (Jan'2024 - Jun'2024)

Data Entries: Call Date, LOCATION, Customer Name, Machine model, Customer reading, Engg. name, Problem Description, Type of Problem (SW/HW), Resolution Provided, Call closed on, REMARKS, SUPPORT MODE, Bill

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	Call Date	LOCATION	Customer Name	Machine model	Customer readi	Engg. name	Problem Descrip	Type of Problem	Resolution Prov	Call closed on	REMARKS	SUPPORT MODE	Bill	
2	January 3, 2024	Delhi Cantt.	DISTRIBUTION L	Ricoh SP C262SF	552617	Mr Vivek	SCAN TO MAIL	SW	Educate to confi	January 3, 2024	Resolved	Remote Support	₹11,520.00	
3	January 3, 2024	E. Delhi	ELECTRONS INDI	Dell B2360dn	433152	Mr Vivek	Magenta color is	HW	Issue resolved af	January 8, 2024	Resolved	Phone	₹3,866.00	
4	January 3, 2024	E. Delhi	GOVT DEGREE C	Sharp 6020	235384	Mr Sunil	print issue -call t	SW	engr confirmed I	January 3, 2024	Resolved	Phone	₹3,700.00	
5	January 3, 2024	W. Delhi	HD PUBLIC SCHC	Xerox	347853	Mr Sunil	Pj issue	HW	Asked to check tray clutch		Pending	Phone	₹3,566.00	
6	January 3, 2024	Delhi Cantt.	Jharkhand state	Brother HL-L237	NA	Mr Vivek	NETWORK ISSUE	SW	Found machine i	January 3, 2024	Resolved	Remote Support	₹2,749.00	
7	January 3, 2024	Gurugram	Ricoh & Co	Canon	381426	Mr Vivek	PJ in Duplex **	HW	Resolved mail fr	January 25, 202	Resolved	Phone	₹3,637.00	
8	January 4, 2024	N.Delhi	Bikaner Vala	Xerox	371720	Mr Vivek	LAN CONNECTIV	SW	Guided to config	January 18, 202	Resolved	Remote Support	₹2,661.00	
9	January 4, 2024	C. Delhi	Bridgewell tech	Lexmark MB223	492638	Mr Sunil	1- on display	HW	harness is dama	January 5, 2024	Resolved	Phone	₹3,013.00	
10	January 4, 2024	Delhi	Harman Kopier S	HP 3015	185971	Mr Sukhpreet	Printer Requeste	HW	Ordered printer	January 5, 2024	Pending	Phone	₹13,888.00	
11	January 4, 2024	C. Delhi	MARUTI ENGINE	Brother HL-L237	568190	Mr Sukhpreet	SCAN TO FOLDEI	SW	Found folder wa	January 4, 2024	Resolved	Remote Support	₹3,086.00	
12	January 5, 2024	U.P	Global ores	Dell B2360dn	474727	Mr Vivek	scan to folder	SW	Educate to enab	January 5, 2024	Resolved	Remote Support	₹3,281.00	
13	January 5, 2024	Gurugram	OASIS GROUP	Kyocera 1800	155439	Mr Sunil	Scan processing	SW	Supported on 05	January 8, 2024	Resolved	Phone	₹3,360.00	
14	January 6, 2024	Delhi Cantt.	AVANTI LEARNII	HP 438 NDA	NA	Mr Sunil	SORTING ISSUE	SW	Guided to use cc	January 6, 2024	Resolved	Remote Support	₹5,735.00	
15	January 8, 2024	U.P	Anil Printers	Konica	311186	Mr Sukhpreet	Unfortunately co	HW	Educate to reset	January 8, 2024	Resolved	Phone	₹2,661.00	
16	January 8, 2024	U.P	IMCD Noida	Konica	NA	Mr Vivek	Add ink	HW	Ink pump motor replaced		Pending	Phone	₹3,680.00	
17	January 9, 2024	Gurugram	AVIATION CARG(	Sharp 6020	235571	Mr Vivek	SCAN TO FOLDEI	SW	Educate to set p	January 9, 2024	Resolved	Remote Support	₹3,793.00	
18	January 9, 2024	C. Delhi	Genetix Bio	Canon	NA	Mr Sunil	SC-371-01	HW	td sensor harnes	January 10, 202	Resolved	Phone	₹3,040.00	
19	January 9, 2024	E. Delhi	SK COMPUTERS	Ricoh SP C262SF	355539	Mr Vivek	scan to folder -	SW	Scan to folder cc	January 9, 2024	Resolved	Remote Support	₹2,366.00	
20	January 9, 2024	W. Delhi	SWITCH GEAR	Canon 3025	190946	Mr Vivek	SCAN TO MAIL	SW	Guided to config	January 9, 2024	Resolved	Remote Support	₹3,840.00	
21	January 10, 202	E. Delhi	DDLR	Xerox	492932	Mr Vivek	NETWORK SETTI	SW	Confirmed issue	January 17, 202	Resolved	Phone	₹3,887.00	
22	January 10, 202	N.Delhi	DIGITAL MINKU	Epson EcoTank L	305266	Mr Sukhpreet	Adf issue	HW	Adf back to back issue		Pending	Phone	₹5,256.00	
23	January 10, 202	W. Delhi	S.D Public Schoo	HP	238571	Mr Vivek	Scan to folder Is:	SW	Other SMTP sev	January 31, 202	Resolved	Remote Support	₹3,417.00	
24	January 12, 202	S.Delhi	ASHOK LEYLAND	Xerox	368875	Mr Sukhpreet	Dead set- unable	HW	Wires cut by rat	January 18, 202	Resolved	Phone	₹8,750.00	
25	January 12, 202	Delhi Cantt.	Kendirya Vidyala	Xerox	103451	Mr Sukhpreet	HALF PRINT ISSL	SW	Issue resolved af	January 12, 202	Resolved	Phone	₹3,400.00	
26	January 12, 202	U.P	THE SOCIAL WEL	Canon 2870	283098	Mr Vivek	SC-554 -Fusing u	HW	Hot roller replac	January 31, 202	Resolved	Phone	₹3,959.00	

Fig. 2: Excerpt of Customer Data (Jan'24 - Jun'24)

Stats Overview:

Data Size: 439 rows*13 columns (including all given months (Jan'2024 - Jun'2024 together)

Calls Volume: *1. Total Calls Logged* : 439   *2. Calls by Location*: ['C. Delhi:63', 'Delhi: 6', 'Delhi Cantt.: 53', 'E. Delhi: 60', 'Gurugram: 65', 'N. Delhi: 65', 'S. Delhi: 34', 'U.P: 42', 'W. Delhi: 51'] *3.*

Calls by Support: 'Remote Support: 132', 'Phone: 307'
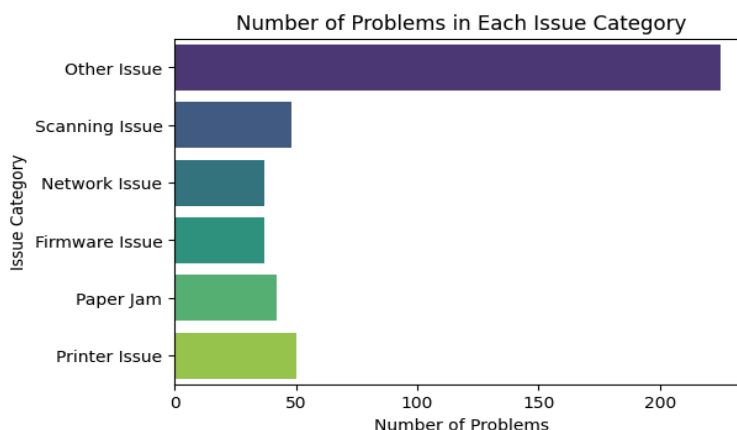
Problem Types: *Software*:278   *Hardware:* 160

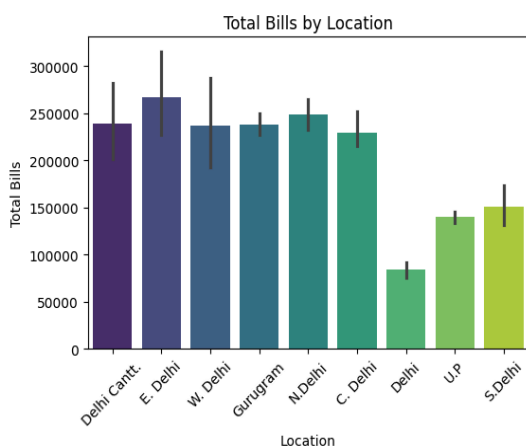**Remarks:** *Resolved:*356   *Pending:* 84   { *Ratio:* 4.23809 }

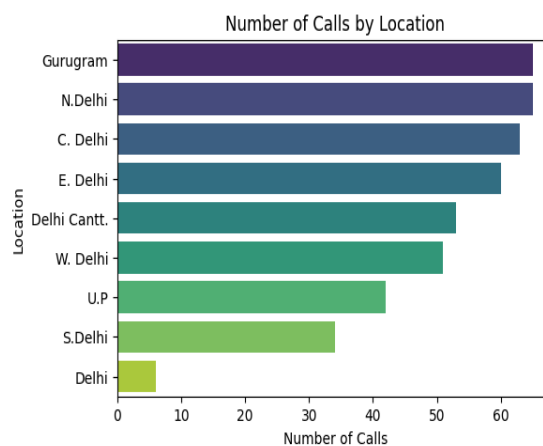**Engineer Assigned Ratio:** *Mr Sukhpreet Singh:* 138   *Mr Sunil:* 146   *Mr Vivek:* 155

	Sum	Mean	Median	Mode	Standard Deviation	Range
Bill:	₹1,834,178.00	₹4,178.08	₹3,574.00	₹3,086	2398.78561	₹1660-₹16759

Fig. 3: Normalised Problem Description column of Customer_Data

Fig.4: Total bills (in ₹) by location analysis (Jan'24-Jun'24)

Fig.5: Customer calls by location analysis (Jan'24-Jun'24)

Explanation of Analysis Methods

Analysis Overview:

- **SWOT Analysis**

  To analyse the problems faced by **HSK Enterprises**, the very first step was to access the business Strengths, Weaknesses, Opportunities and Threats.

  ➔ **Strengths:** Good in providing resolutions on time, Strong networks with various firms, educational institutions, Good perks offered to employees

  ➔ **Weaknesses:** High employee turnover, Not focused on advertising, Less time given to

operational management leading to issues with data management, difficulty in keeping tracks, Not able to give proper maintenance to all the machines managed by the business resulting in low revenue

➔ **Opportunities:** Ample amount of softwares to manage the data, bills and keep track of them, Making online business presence to boost up the business

➔ **Threats:** Not able to manage time on business operations leading to low revenue, High amount of clients and less number of employees leading to potential bottleneck in maintaining the machines is the main factor for potential revenue issues

Justification: SWOT Analysis provides a strategic overview of the firm's internal and external environments. It is a comprehensive method that helps in formulating strategies to leverage strengths, mitigate weaknesses, capitalize on opportunities, and prepare for threats.

Employee Data Analysis:

To address the challenges of employee satisfaction, retention, and operational costs at HSK Enterprises, a comprehensive problem-solving data-driven and logical approach was required. *Below is the methods I used to analyze this problem.*

● **Organizational Analysis:**

The first step I chose for employee retention problem was to interview the business owner about the past employee management strategies he used and after a series of questions, I got to know that even though the conpensation/convince and other perks given to employees were good but the salary offered was not matching up with the work time that was being assigned to them. Because of having a lot of clients, the efficiency of employees gets deteriorated. So, I analysed the employee data given by the business owner.

● **Root Cause Analysis (RCA):**

At **HSK Enterprises**, high employee turnover is driven by dissatisfaction with salary and overtime. **Reasons for Leaving chart Fig.9 (Pg.no9)** reveals that the salary/compensation mismanagement was the primary cause. The 5 Why's technique below identifies a lack of a structured compensation review process as the root cause.

Root Cause Identification Using the 5 Why's Technique:

1. **Why did employees leave?** They were dissatisfied with their salary and overtime.
2. **Why were they dissatisfied with their salary and overtime?** The compensation was not competitive compared to current industry standards.
3. **Why was the compensation not competitive?** There was a lack of business operations management.
4. **Why was there a lack of business operational management?** The company lacked a structured way of managing the data and assigning the employees.
5. **Why was there no structured way to manage the data?** The company lacked a formal HR strategy because the owner was not getting enough time to manage.

Customer Data Analysis:

To address the issues related to operational inefficiencies, a comprehensive data-driven

approach was required. *Below is the methods I used to analyze this problem.*

- **Pareto Analysis:**
  Objective: To identify the most significant problems by focusing on the "80-20 rule", which states that roughly 80% of the effects comes from the 20% of the causes.

After preprocessing the customer_data, the 'Problem Description' column had to be normalised more to get some insights on what the most common occurring problems were. I used ***Sentence Transformers*** with ***sklearn*** (Python Machine Learning Library) which normalises the problems and then Pareto Analysis was observed.
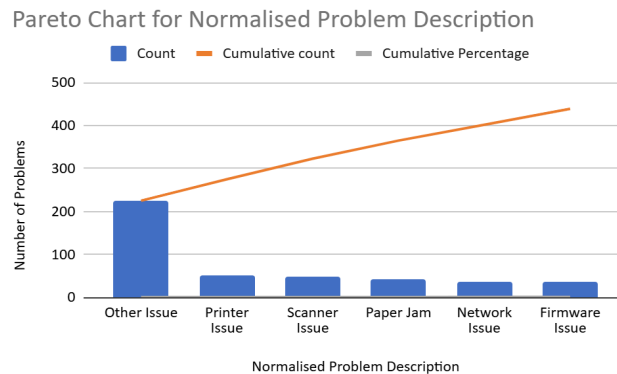
Fig. 6: Pareto Chart of Normalised Problem Description column of Customer_Data

Justification: Pareto Analysis helps prioritize issues by highlighting the most critical factors affecting the customer service problems. This method is particularly useful for focusing efforts on the most impactful areas, making it more actionable and efficient compared to broad analyses.

- **Statistical Quality Control Analysis (SQC):**
  Objective: This method is used to monitor and control the quality of processes and outputs through statistical methods.
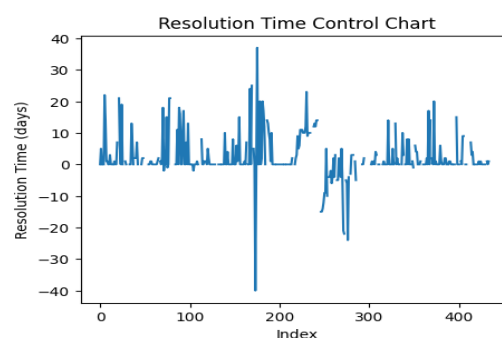
**Fig. 7:** Resolution Time Control Chart (STQ)

After making the Statistical Time Quality Control chart for Resolution Time Control, it was observed that most of the resolutions were getting solved at the same day of the issued call which ensure that this particular metric was within the acceptable range. *The negative y-values indicates that the value was not filled in the raw_data and these negative spikes can be ignored.*

Justification: SQC is effective for maintaining consistent quality and identifying variations in processes. It allows for ongoing monitoring and improvement, ensuring that operational

processes remain efficient and within set standards.

- **Ishikawa (Fishbone) Analysis:**

Fishbone analysis was also done to analyse whether the frequency of resolution time matched with our SQC analysis.
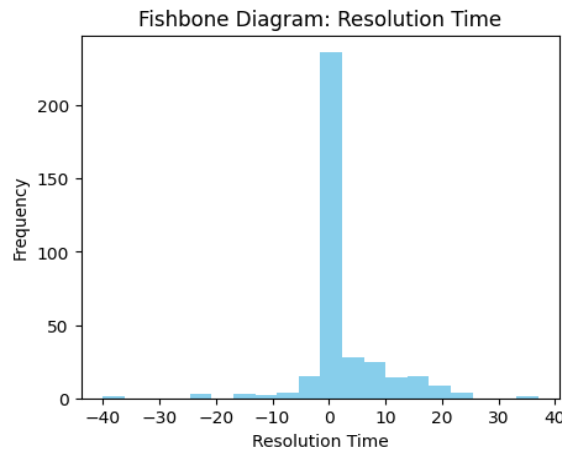
Fig. 8: Fishbone Resolution Time Chart

Justification: Fishbone Diagrams offers a structured way to explore and identify potential causes of recurring issues or delays in problem resolution.

# *Why theses analysis methods are appropriate than the rest?*

These methods are aligned to solved what the specific business problem is there and the justification has been provided for the specific analysis I used.

Result and Findings

Employee Data Analysis

The analysis of employee data highlights significant trends and issues affecting HSK Enterprises. The key findings are:

- **Top Reasons for Leaving:** The analysis of Reason for leaving chart reveals that salary dissatisfaction is the primary driver of turnover. This trend underscores the need for a structured compensation review process.
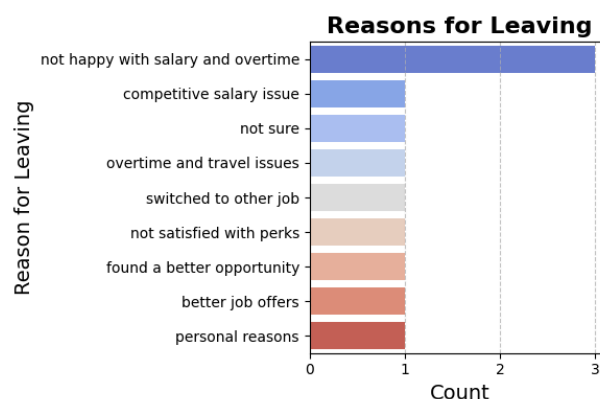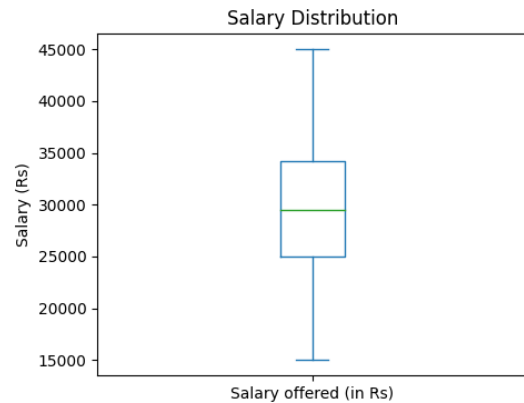
- **Salary and Performance:**

  Compensation Issues: The statistical summary of salaries shows a range with deviations. The lack of alignment between compensation and job demands contributes to employee dissatisfaction.
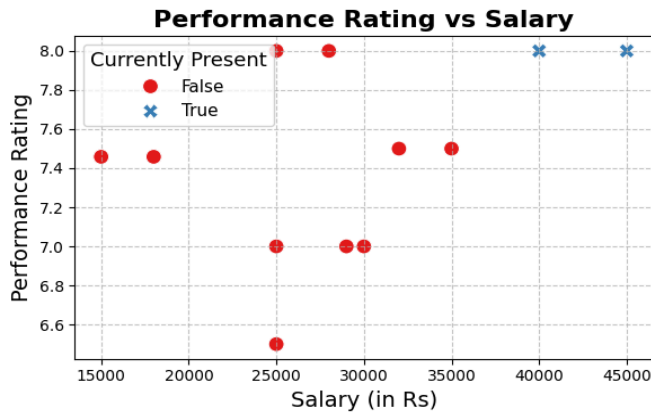
Fig. 10: Performance Rating vs Salary Graph   **Fig. 11:** Distribution of Salary (Candle Graph)

- **Turnover Trends:**

  High Turnover Rate: A notable percentage of employees left the company due to dissatisfaction with salary and overtime. **The Performance Rating vs. Salary graph (Fig. 10)** shows a negative correlation between performance ratings and salary, indicating that employees who felt inadequately compensated were more likely to leave.

Recommendations:

- Compensation Review: Implement regular salary reviews and providing enough convince to ensure competitive compensation. Implementing policy changes to ensure employees are committed to staying with the company for the specified duration and reduce premature departures.
- Employee work culture: Improving work culture by introducing various ways like 'employee of the month celebration', etc to boost employee's moral.

Customer Data Analysis

The customer data analysis provides insights into operational inefficiencies and service quality:

- **Issue Frequency:**

  Pareto Analysis: **The Pareto chart (Fig. 6)(Pg. no 8)** shows that the normalised issues are mostly even. Addressing these problems efficiently can significantly improve overall customer satisfaction.

  Problem Types: Analysis of problem types (software vs. hardware) reveals that software issues are more frequent, highlighting the need for better software support and troubleshooting.

- **Operational Efficiency:**

  Resolution Time: **The Statistical Quality Control (SQC) chart (Fig. 7)(Pg. no8)** indicates that most issues are resolved within an acceptable timeframe, but there are occasional delays that need to be addressed.

  Resolution Analysis: **The Fishbone Diagram (Fig. 8)(Pg. no9) or Distribution of Resolution to Frequency Graph(Fig. 12)(Pg. no11)** identifies *potential* causes of resolution delays, that may

include inadequate employee training or inefficient processes.

Distribution of Resolution Times
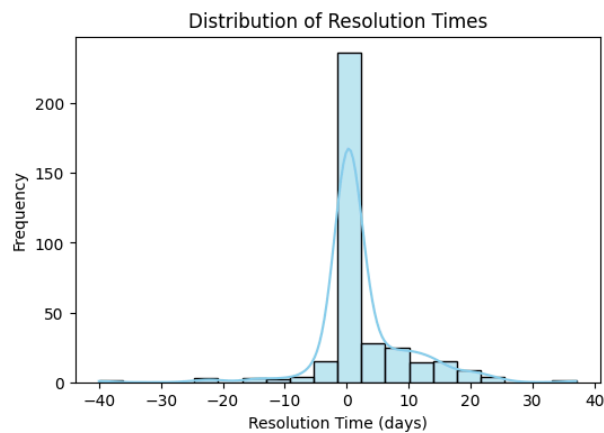
Fig. 12: Distribution of Resolution to Frequency Graph

Recommendations:

● Focus on Common Issues: Prioritize addressing the most common issues identified in the Pareto analysis.
● Improve Resolution Processes: Streamline resolution processes and provide additional training to reduce delays and enhance service quality.

Google Colab for <u>complete mid term</u> analysis charts can be found below:

● Employee Analysis Charts: <u>click here</u>

● Customer Data Analysis Charts: <u>click here</u>