Streamlining Customer Orders and Payments in Iron Trading

A Mid-Term Submission for the BDM capstone Project

Submitted by

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Executive summary and Title

Title - Streamlining Customer Orders and Payments in Iron Trading

This report provides a comprehensive analysis of operational efficiency, payment practices, and logistics management for Aditya Iron Trading, a B2B organization specializing in iron and iron products, based in New Delhi. The analysis covers data collected from April 2024 to August 2024, involving transactions with 136 different businesses.

The operational cost analysis reveals that labor charges significantly influence the company's profitability. Specifically, labor charges constituted 42.6% of total revenue in April, primarily due to frequent small-value orders increasing operational complexity. In contrast, May saw labor charges decrease to 29.6%, attributed to fewer but larger consolidated orders. This clearly indicates that order consolidation directly reduces operational costs and enhances net profit margins. Salaries remained constant at ₹50,000 per month, indicating minimal impact on cost variability.

Regarding payment delays, the analysis highlights significant variability in customer payment behavior. While some customers displayed excellent payment discipline—settling payments within just two days—the average pending period was 95 days. However, extreme cases were also observed, with delays extending up to 307 days, causing cash flow disruptions. Most businesses (52) paid within the first 90 days, but a smaller yet crucial segment delayed payments significantly beyond acceptable time frames.

Logistics inefficiency was analyzed geographically using pin-code segmentation. The majority of revenue (53.2%) originated from pin-code 13, followed by pin-codes 11 (18.8%) and 12 (16.1%). Pin-codes 20 and 30 contributed minimally (~11.5%), suggesting targeted logistics improvements in high-revenue regions could considerably enhance customer satisfaction and operational efficiency.

In conclusion, Aditya Iron Trading should encourage customers to consolidate orders to reduce labor costs and streamline operations. Additionally, implementing stricter payment policies and optimizing logistics for high-revenue regions will significantly improve cash flow management and operational effectiveness.

Proof of originality of Data

- **Organisation's Name:** Aditya Iron Trading
  - GSTIN - 07LUIPS6677N1Z9
  - MSME NO – UDYAM-DL-03-0016986
- **Type of Organisation:** B2B (Business-to-Business)
- **Organisation's Location:** Y-95, 2nd Floor, Loha Mandi, Naraina, New Delhi -110028
- **Owner's Name:** Mr. Aditya Pratap Singh
- **Owner's Phone Number:** +918287477117
- **Number of Employee:** 3 + (Labours hire on required bases)
- **Working Time:** 10:00 AM to 7:00 PM (9 hours)
- **Categories Available:** Different types of Iron and Iron products

PROOF OF ORIGINALITY : Link

GSTIN – 07LUIPS6677N1Z9 PHONE NO -8287477117

ADITYA IRON TRADERS

ADITYA IRON TRADERS

Y-95 , IINd Floor , Loha Mandi , Naraina , New Delhi -110028

Gmail – singhadityapratap72@gmail.com

DATE - Monday,
10 October, 2024

TO WHOMSOEVER IT MAY CONCERN

I, Aditya Pratap Singh, the Founder of Aditya Iron Traders, am writing this letter to officially confirm the authorised transfer of data to Mr Abhishek Jha from IIT Madras for the purpose of the Business Data Management Capstone Project.

Our collaboration with IIT Madras has been initiated transparently, and we willingly provided the necessary data to Mr. Abhishek Jha for the aforementioned project. This data transfer aligns with our commitment to fostering collaborative relationships that contribute positively to the objectives of both organizations.

This letter serves as formal documentation attesting to the legitimacy and authorised nature of the data transfer for the Business Data Management Capstone Project. We trust that Mr. Abhishek Jha and IIT Madras will handle this information with the utmost confidentiality and utilize it exclusively for the agreed-upon objectives of the project.

Should there be any inquiries or need for clarification regarding this matter, please feel free to contact us directly.

Yours Faithfully,

Aditya Pratap Singh
Founder & CEO,
Aditya Iron Traders

FOR ADITYA IRON TRADERS :

Authorised Signatory

Recap of the Problem Statement(s)

Operational Cost Increase: Aditya Iron Traders faces rising operational expenses due to customers placing multiple orders throughout the month. This project aims to conduct an in-depth analysis of customer ordering patterns and recommend strategies to streamline order frequency, optimizing cost-efficiency.

Payment Delays: Aditya Iron Traders struggles with cash flow issues caused by delayed customer payments after goods are delivered. This research seeks to explore alternative payment models and develop strategies to alleviate the financial strain from delayed payments.

Logistics Inefficiency: Aditya Iron Traders encounters challenges with delayed shipments, impacting customer satisfaction and operational performance. This study focuses on analysing the current shipment processes and proposing solutions to reduce delivery times and enhance overall logistics efficiency.

Meta Data

Dataset

The data collection process for Aditya Iron Traders involved gathering relevant information for the period from **April 2024 to August 2024**. Initially, I contacted the owner directly, who provided the required data via my personal email in Tally format. Since I was unfamiliar with Tally software, I sought assistance from a senior accountant who guided me in operating Tally and extracting the data into Excel format. After exporting the data, I carefully reviewed, cleaned, and organized it in Excel to ensure accuracy and readiness for analysis, details of which are presented clearly in the subsequent sections of this report.

	A	B	C
1	**Particulars**	Count of Debit	**Sum of Debit**
2	AASHU ENTERPRISES	2	140284
3	AAWAM RESIDENCY PRIVATE LIMITED	1	60837
4	ABHISHEK SINGH	1	27063
5	ABRAR HUSSAIN	1	70222
6	ADS STEEL FABRICATIONS	1	297661
7	Aidee Machines	4	1283255
8	AMK INFRASTRUCTURES	3	734473
9	ASHWANI SHARMA	1	14302
10	Bharat Iron Tubes	1	29913
11	BHUP CHAND MAHAWAR	2	137871
12	BMC POWER CO	1	167811
13	CITY POWER ENGINEERING	1	26060
14	EL ARTE INDIA LLP	2	24285
15	G R STEEL TRADERS	1	5705
16	G S ENTERPRISES	1	452318
17	G. S. SALES CORPORATION	1	263801
18	G.S. CONSTRUCTIONS	2	150509
19	GURSHARAN SINGH	1	7800
20	HR POWER ENGINEERS PRIVATE LIMITED	3	236931
21	ICMC PROJECTS PRIVATE LIMITED	3	526118

Monthly sales Data

Particulars: The name of Business's.
Count of debit: The no. of times Business order.
Sum of Debit: Sum of total amount which a business purchase in that month.

	A	B	C	D	E	F
1	Date	Particulars	Vch Type	Vch No.	Debit	Pin code
2	01-Apr-24	MANOHAR FILAMENTS PVT LTD	Sales	1	21463.00	131028
3	01-Apr-24	JENA BUILDCON PRIVATE LIMITED	Sales	2	69237.00	110005
4	01-Apr-24	JASMINDER ENGINEERING WORKS	Sales	3	73908.00	110018
5	01-Apr-24	Aidee Machines	Sales	4	367676.00	124507
6	01-Apr-24	MODERN CONSTRUCTION CO (INDIA)	Sales	5	338097.00	201005
7	01-Apr-24	Modern Civil Construction LLP	Sales	6	153851.00	201014
8	01-Apr-24	AASHU ENTERPRISES	Sales	7	110247.00	110045
9	01-Apr-24	G.S. CONSTRUCTIONS	Sales	8	17381.00	110059
10	02-Apr-24	G.S. CONSTRUCTIONS	Sales	9	133128.00	110059
11	02-Apr-24	JSG INNOTECH PRIVATE LIMITED	Sales	10	63997.00	131028
12	02-Apr-24	JSG INNOTECH PRIVATE LIMITED	Sales	11	14136.00	131028
13	02-Apr-24	HR POWER ENGINEERS PRIVATE LIMITED	Sales	12	153851.00	110085
14	02-Apr-24	MANOHAR FILAMENTS PVT LTD	Sales	13	3318.00	131028
15	02-Apr-24	MANOHAR FILAMENTS PVT LTD	Sales	14	49717.00	131028

Sales Data with Pin Code

Particulars: Business's Name.

Vch Type: Type of Purchase.

Vch No.: Serial no. in which business gives order.

Debit: Amount of order.

Pin Code: Pin code of location of business.

	A	B	C	D
1	**ADITYA IRON TRADERS**			
2	NARAINA LOHA MANDI2ND FLOORY-95,NARAINA			
3	NEW DELHI -110028			
4	MSME NO - UDYAM-DL-03-0016986			
5	E-Mail : singhadityapratap72@gmail.com			
6	**Indirect Expenses**			
7	Group Summary			
8	1-Apr-24 to 30-Apr-24			
9		*Indirect Expenses*		
10		**ADITYA IRON TRADERS**		
11	**Particulars**	1-Apr-24 to 30-Apr-24		
12		**Transactions**		**Closing**
13		Debit	Credit	**Balance**
14	**SALARY A/C**	*50000.00*		**50000.00 Dr**
15	LABOUR & CARTAGE-5% RCM (GST)	*279560.00*		279560.00 Dr
16	ROUNDING OFF	*29.61*	*29.13*	0.48 Dr
17	**Grand Total**	***329589.61***	***29.13***	**329560.48 Dr**

Other Expenses

Particulars: Types of expense.

Transactions: Debit or credit.

	A	B	C	D	E	F
1	**ADITYA IRON TRADERS**					
2	NARAINA LOHA MANDI2ND FLOORY-95,NA					
3	NEW DELHI -110028					
4	MSME NO - UDYAM-DL-03-0016986					
5	E-Mail : singhadityapratap72@gmail.com					
6	**Profit & Loss A/c**					
7	1-Apr-24 to 30-Apr-24					
8		**ADITYA IRON TRADERS**			**ADITYA IRON TRADERS**	
9	**Particulars**	1-Apr-24 to 30-Apr-24		**Particulars**	1-Apr-24 to 30-Apr-24	
10	**Opening Stock**		**301412.22**	**Sales Accounts**		**9101615.90**
11	**Purchase Accounts**		**8786520.67**	**Closing Stock**		**643145.99**
12	**Direct Expenses**				**9744761.89**	
13	***Gross Profit c/o***		***656829.00***	***Gross Profit b/f***		***656829.00***
14		**9744761.89**				
15	**Indirect Expenses**		**329560.48**			
16	***Nett Profit***		***327268.52***			
17	**Total**		656829.00	**Total**		656829.00

Profit & Loss Data

Particulars: Types of accounts.

Gross Profit c/o: The difference between sales and direct expenses.

Net Profit: The final profit after deducting indirect expenses from gross profit

Period Covered: Apr'24

	A	B
1	**Particulars**	Days
2	AASHU ENTERPRISES	49
3	AASTHA CONTRACTS INDIA PRIVATE LIMITED	155
4	AAWAM RESIDENCY PRIVATE LIMITED	155
5	ABIA INTERNATIONAL	155
6	ADS STEEL FABRICATIONS	53
7	Aidee Machines	30
8	AIR STACK (INDIA)	155
9	AJAY RAJ CONSTRUCTIONS CO.	155
10	AMIT BUILDWELL PRIVATE LIMITED	155
11	AMK INFRASTRUCTURES	69
12	ASHWANI SHARMA	43
13	Auxein Medical Pvt. Ltd.	155
14	Balaji Steel Traders	25
15	BMC POWER CO	184
16	DSR CONSTRUCTIONS CO.	155
17	EL ARTE INDIA LLP	136
18	FABRIONEER TENSILE STRUCTURES LLP	23
19	FRIENDS ELECTRICAL SYSTEMS	55
20	G.S. CONSTRUCTIONS	68

Pending Payments Detail

Particulars: Name of Business's.

Days: Number of days since business payment is pending.

Descriptive Statistics

My data represents the total purchases made by 136 businesses over a period of 5 months. The descriptive statistics provide insights into the distribution and variability of these sales figures.

1. Count (136)

- My data has a count of 136, which means I have 136 different businesses in total.

2. Mean (₹653,616.78)

- My data has a mean (average) value of ₹653,616.78. This means that, on average, each business has purchased ₹653,616.78 worth of goods over these 5 months. In simple words, this number gives me an idea about how much a typical business usually spends.

3. Minimum (₹2,931)

- My data has a minimum value of ₹2,931. This means the lowest amount any business has purchased in these 5 months is ₹2,931. In simple words, some of businesses are buying very little, so their contribution to total sales is quite small.

4. Maximum (₹12,686,697)

- My data has a maximum value of ₹12,686,697. This means the highest amount any business has purchased in these 5 months is ₹12,686,697. In simple words, this business is the biggest buyer and probably contributes a large part of total sales revenue.

5. Range (12,686,766)

- My data has a range of ₹12,686,766. This means the difference between my highest and lowest business purchase amounts is ₹12,686,766. In simple words, there is a very large gap between what my top business spends and what my lowest business spends, showing a big difference in business buying behavior.

6. Variance (2,129,795,279,598)

- My data has a variance of ₹2,129,795,279,598. This means the purchase amounts of business are very spread out around the average. In simple words, there is a big difference in how much different business are spending, showing a wide range of spending patterns among them.

7. Standard Deviation (1,459,381.814)

- My data has a standard deviation of ₹1,459,381.814. This means business purchase amounts vary a lot from the average purchase amount. In simple words, some business buy much more or much less compared to the average, showing that business spending behavior is very different from each other.

8. Skewness (5.476)

- My data has a skewness of 5.476, which is positive. This means most of business have purchased smaller amounts, but a few business have spent significantly higher amounts (outliers). In simple words, sales are mostly dependent on a few high-value business, while the majority of business contribute less.

9. The fastest payment recorded was made after just 2 pending days. This indicates that some business pay very quickly, showcasing efficient payment practices among certain businesses.

10. The longest payment delay recorded is 307 days, indicating that some customers take a significantly long time to settle their payments.

11. On an average, customers take 95 days to complete their payments, reflecting the typical duration of pending days observed across all customers.

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Detailed Explanation of Analysis Process

Operational Cost Increase

The data for five months, including labor charges, salaries, and indirect expenses, was analyzed to understand the cost structure.

My sales data did not have many missing values. However, there were canceled orders, which could be considered as missing values because their columns had no data—they were completely blank and marked as canceled. I removed all these canceled orders from the dataset. In the pending payment data, there was one record showing a pending duration of 2231 days, but this is impossible since the business started in April 2022. Therefore, I treated this as misleading data and deleted that column. I also spent some time carefully checking for duplicate values but did not find any duplicates in my dataset.

All expenses were summed up to calculate the total operational costs for each month. A comparison was made between different expense categories to identify which contributed the most to the overall costs. Excel was used to organize the data, perform calculations, and create visualizations like charts to highlight trends and patterns in operational expenses.

Payment Delays

Customer repayment data was analyzed by dividing it into bins with 3-month intervals (90, 180, 270, and 360 days). The frequency of customers repaying within each interval was calculated to understand repayment patterns. Excel was used to create these bins and calculate the frequencies efficiently.

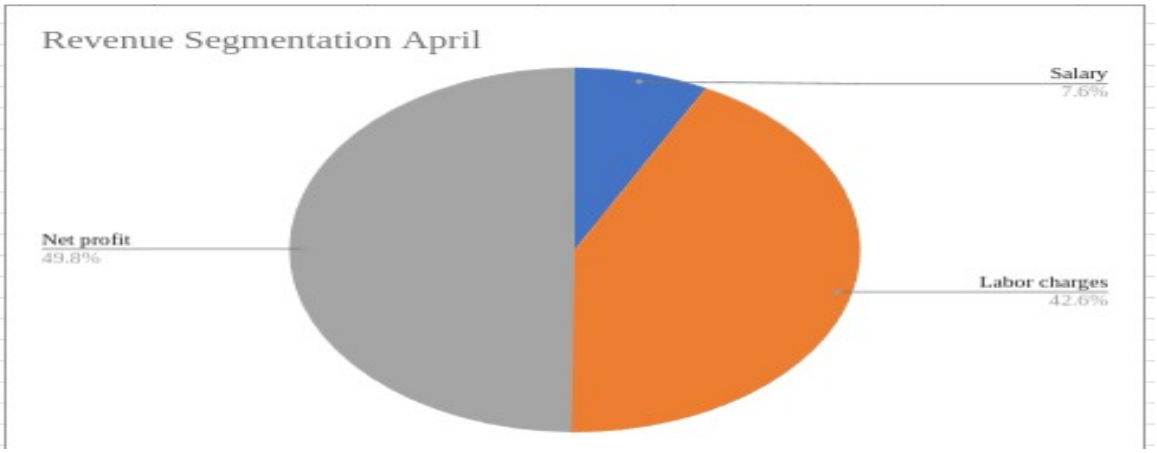
Logistics Inefficiency

To address logistics inefficiency, sales data was analyzed by extracting the first two digits of pin codes to group them into geographical bins. The total sales for each bin were calculated to identify areas with the highest and lowest sales. This analysis helped pinpoint regions where timely shipments are critical due to high sales volumes. Excel was used for this process, leveraging its functions to extract pin code prefixes, group data, and calculate total sales for each bin. A bar graph was then created to visualize the distribution of sales across regions, making it easier to identify priority zones for improving shipment processes.

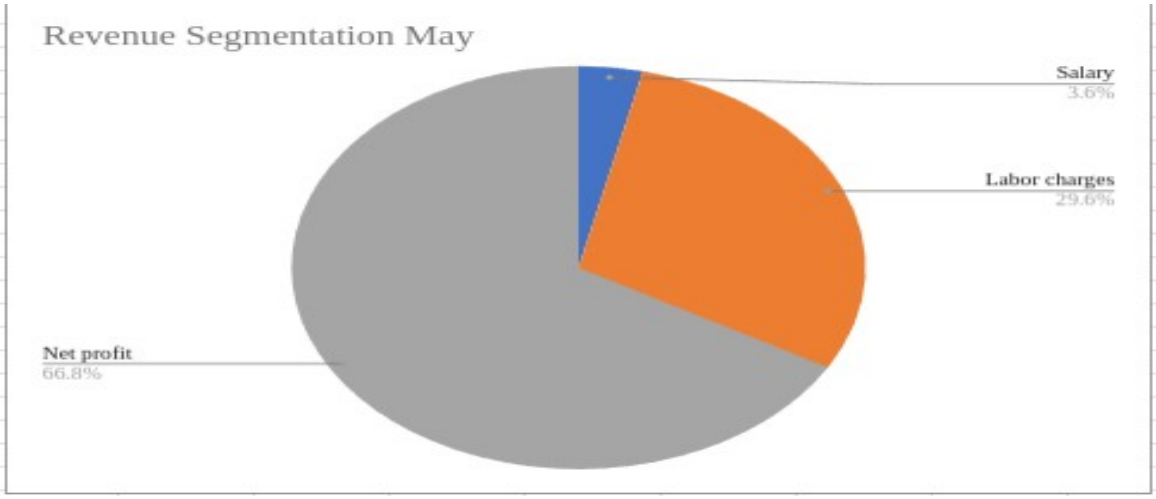
Results and Findings

Monthly Trends in Operational Costs

From the data for April and May, it is evident that labor charges form a significant portion of the total operational costs. For example:



The graph clearly indicates that labor charges account for a significant share, specifically 42.6%, of the total revenue segment. Moreover, this is not limited to just one month; the same pattern consistently appears across all months analyzed.



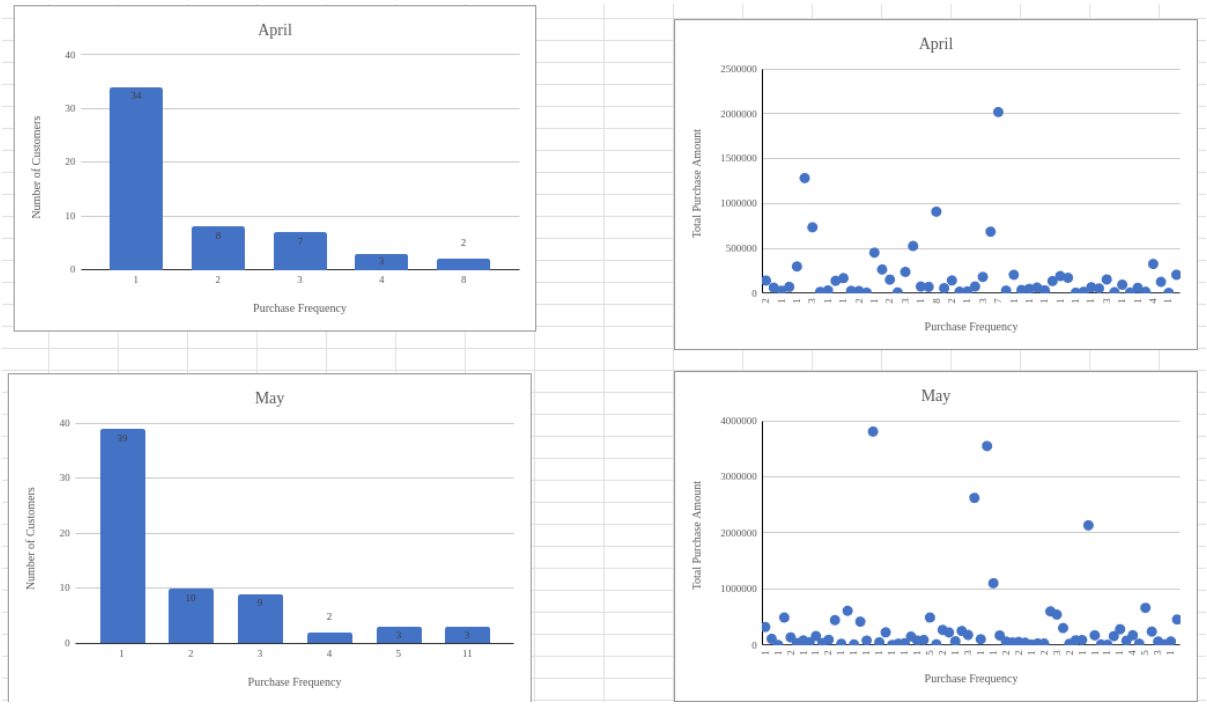
The month of May also follows a similar pattern. Here, we can clearly observe that whenever labor charges decrease, net profit tends to increase.

This trend indicates that fluctuations in labor charges are a primary driver of rising operational costs. Salaries remain constant at ₹50,000 per month, suggesting they are not a major contributor to cost variability.

Observed Patterns and Implications

The analysis shows a clear pattern where labor charges rise significantly in months with higher purchase frequencies. For instance:

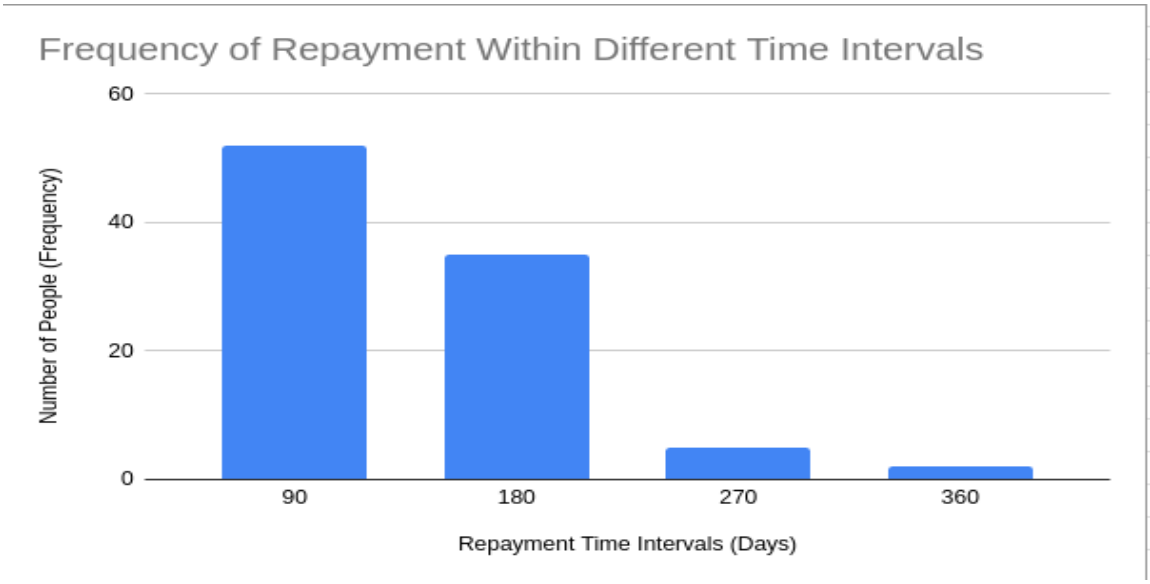
Analyzing both charts, we observe that in April, labor charges accounted for a relatively higher percentage (42.6%) of total revenue, whereas in May, this percentage decreased to 29.6%. Lets see, Why this happened ?



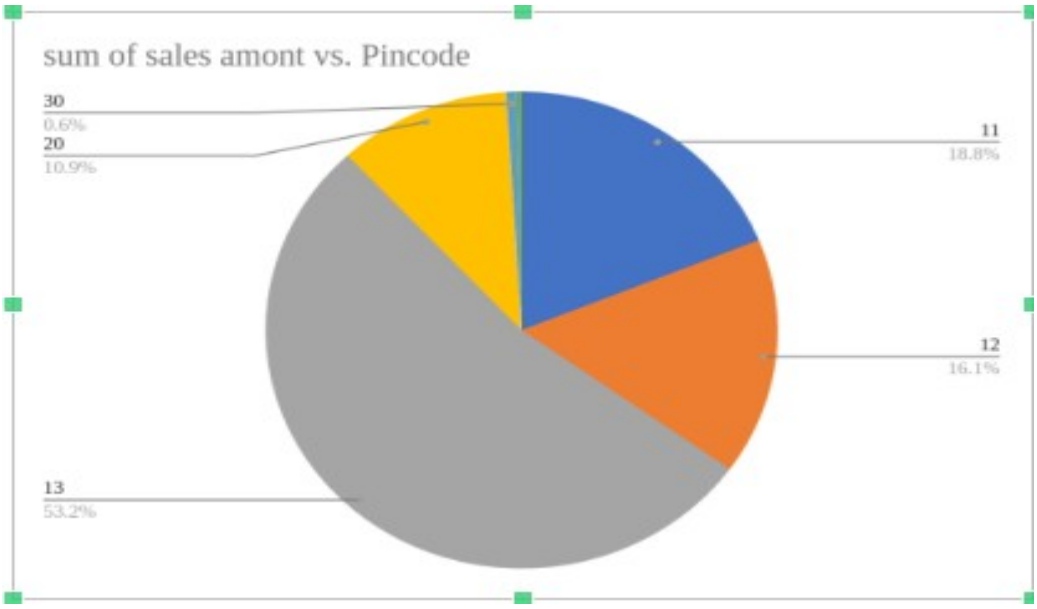
From the pie chart, we can understand that the labor charges percentage was higher in April because, during that month, we did not receive many high-value orders. Basically, we received smaller-value orders, as indicated by the "purchase frequency vs. total purchase amount" data. However, if we focus on some spike points in May, we notice that larger orders were consolidated and placed at once. Such high-value spikes are not prominently visible in April's data.

This finding underscores the need for strategies to streamline order frequency. Encouraging business to consolidate their purchases into fewer transactions could reduce labor costs without compromising revenue.

Payment Delayed



The bar graph clearly shows that the majority of business's (52) repay within the first 90 days, indicating that a large portion of payments are received relatively quickly. However, there is a noticeable drop in frequency for the next interval, with only 35 business's repaying within 180 days. Beyond this, the number of business's repaying decreases significantly, with just 5 business's taking up to 270 days and only 2 business's delaying payment for up to 360 days. This trend highlights that while most payments are timely, a smaller but critical portion of customers delay payments beyond acceptable time frames, contributing to cash flow challenges.



The pie chart that represents the sum of sales amount distributed across different Pin-Codes. Let me explain each segment and what it means:

Largest Segment (Pin-code 13 - Gray, 53.2%):

- The gray section (53.2%) represents the sales from Pin-code 13.
- This means more than half of business's revenue comes from customers in this pin-code.

Second Largest Segment (Pin-code 11 - Blue, 18.8%):

- The blue section (18.8%) represents sales from Pin-code 11.
- Pin-code 11 also contributes significantly to revenue but is much smaller compared to Pin-code 13.

Third Largest Segment (Pin-code 12 - Orange, 16.1%):

- The orange section (16.1%) represents sales from Pin-code 12.

- This pin-code contributes moderately to sales and could be explored for growth opportunities.

Smallest Segments (Pin-codes 20 and 30 - Yellow and Light Blue, Total ~11.5%):

- The yellow section (10.9%) represents sales from Pin-code 20, and the light blue section (0.6%) represents sales from Pin-code 30.
- These pin-codes contribute very little to total sales, suggesting they might have fewer business’s or lower purchasing power.