

BUSINESS DATA MANAGEMENT CAPSTONE PROJECT

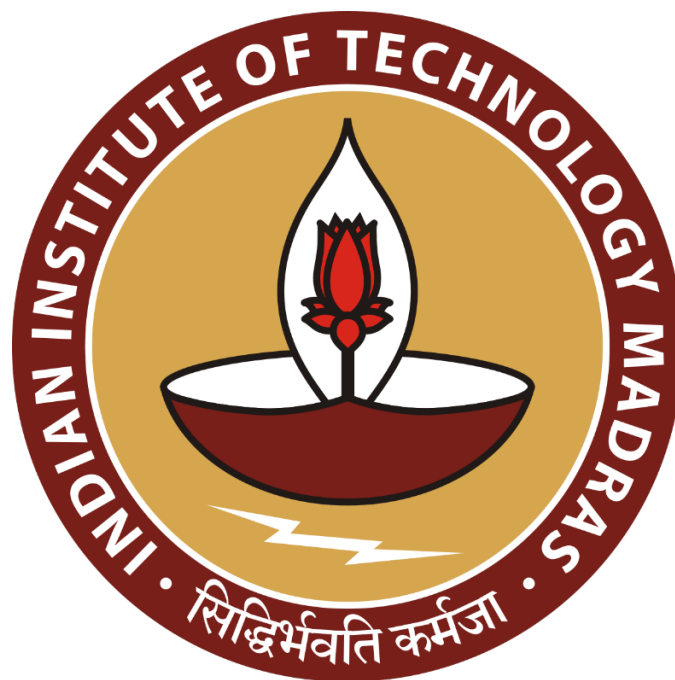
FINAL REPORT

**Enhancing Operational Efficiency and Profitability
Through Inventory Optimization and Seasonal Sales Analysis
for A Paper Trading Firm**

SUBMITTED BY

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Declaration Statement

I am working on the project, titled “**Enhancing Operational Efficiency and Profitability Through Inventory Optimization and Seasonal Sales Analysis for A Paper Trading Firm**”. I extend my appreciation to **Indra Impex Corporation** for providing the necessary resources that enabled me to conduct my project.

I hereby assert that the data presented and assessed in this project report is genuine and precise to the utmost extent of my knowledge and capabilities. The data has been gathered through primary sources and carefully analysed to assure its reliability.

Additionally, I affirm that all procedures employed for the purpose of data collection and analysis have been duly explained in this report. The outcomes and inferences derived from the data are an accurate depiction of the findings acquired through thorough analytical procedures. I am dedicated to adhering to the information of academic honesty and integrity, and I am receptive to any additional examination or validation of the data contained in this project report. I understand that the execution of this project is intended for individual completion and is not to be undertaken collectively. I thus affirm that I am not engaged in any form of collaboration with other individuals, and that all the work undertaken has been solely conducted by me. If plagiarism is detected in the report at any stage of the project's completion, I am fully aware and prepared to accept disciplinary measures imposed by the relevant authority. I agree that all the recommendations are business-specific and limited to this project exclusively and cannot be utilized for any other purpose with an IIT Madras tag. I understand that IIT Madras does not endorse this.

Signature of the Student



Akshita Mittal

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I. Executive Summary

Enhancing Operational Efficiency and Profitability Through Inventory Optimization And Seasonal Sales Analysis For A Paper Trading Firm

Indra Impex Corporation is a small **B2B Paper Trading company** of 10 employees based in Naraina, Delhi, and Kundli, Haryana, owned by Mr. Abhishek Gupta. The firm focuses on delivering quality paper products to businesses, such as offices, printing presses, or packaging companies which use paper as a raw material for their day-to-day usage. Established in 2016, they have steadily grown their operations with an annual turnover of 10-25 Crore.

The firm aims to **enhance its operational efficiency and overcome over stockage**. The company faces non-uniformity of sales over the year due to the seasonal nature of paper demand. Moreover, the paper market faces low inventory turnover (High Supply, Low Demand). Additionally, since the company mainly imports its products, it also faces an unreliable market due to geopolitical concerns. All these issues have been tried to be addressed in this report.

The dataset used are – **Sales Data, Stock data and Procurement Data**. Sales Register provided information about seasonality of sales over the year, most frequent buyers, and revenue distribution among various buyers. Stock data contained Inward, Outward and Closing and Opening Balance. Information extracted were the most sold products, based on the type, and the most brought brand of paper. Procurement Data Analysis was aimed to understand the firm's procurement landscape.

Based on various analysis, it was understood that the sales of the firm are concentrated in very few products, of certain brands. Moreover, the moving average graph highlighted that the sales were very non-uniform in the sense that it consists of very large sales distributed between small sales, thus putting dependence on those few sale peaks for revenue. Majority of the revenue is also concentrated among few frequent buyers. The procurement and sales graph highlighted the colossal gap between the procurement and sales of the firm due to opportunistic purchases of the firm which led us to understand the reason behind over stockage. SWOT Analysis was also done to understand the whole landscape better.

Based on various data analysis, discussions with the owner of the firm, **various recommendations were provided** to improve the Operational Efficiency and Profitability of the firm.

II. Detailed Explanation Of The Analysis Process

The datasets provided were in the form of Excel sheets, from the company's data managing system. The data collected was from April 2022 to March 2023 (FY 2022-23). Following Datasets were provided:

1. Sales Register Dataset
2. Stock Summary (Inward and Outward Data)
3. Procurement Data

1) Sales Register Dataset

Pre-processed Sales Register contained the following columns among many. The empty and irrelevant columns were removed, and useful columns were retained. Moreover, since the data dealt with very high values, all the values were scaled by 1 Lakh for easier analysis and visualization of all the datasets provided. An extra column named 'Month' was created for ease in creating Pivot Table.

Indra Impex Corporation 487, EPIP, Sector 53, HSIIDC, Phase 3, Kundli Industrial Estate, Distt Sonapat, Haryana - 131028 Udyam Regn No: UDYAM-DL-10-0004798 FSC Certificate Code: RR-COC-000710 Contact : 9810225567										
Sales Register										
1-Apr-22 to 31-Mar-23										
Date	Particulars	Voucher Type	Voucher No.	Delivery Note No. & Date	Despatch Doc. No	Despatch Through	Destination	Quantity	Alt. Units	Gross Total
01-Apr-22	Paper Hub	SALES INVOICE	K/ T-0001/ 22-23					24.00 Pkt	588.000 Kgs	91025.00 Dr
01-Apr-22	Concept Advertising Agency	SALES INVOICE	K/ T-0002/ 22-23					13.50 Rm	617.625 Kgs	75380.00 Dr
01-Apr-22	Indra Impex Corporation (Delhi)	SALES INVOICE	K/ T-0003/ 22-23					17.00 Rm	806.630 Kgs	63464.00 Dr
01-Apr-22	Thomson Press (India) Ltd. (100% EOU)	SALES INVOICE	K/ T-0004/ 22-23					14100.000 Kgs		1899408.00 Dr
04-Apr-22	Lustra Print Process Pvt. Ltd.	SALES INVOICE	K/ T-0005/ 22-23					5021.354 Kgs		636263.00 Dr
04-Apr-22	SRV Services	SALES INVOICE	K/ T-0006/ 22-23					12.00 Rm	284.400 Kgs	35675.00 Dr
04-Apr-22	Niyogi Offset Pvt. Ltd.	SALES INVOICE	K/ T-0007/ 22-23					18.00 Rm	817.380 Kgs	101242.00 Dr
04-Apr-22	Archana Advertising Pvt. Ltd.	SALES INVOICE	K/ T-0008/ 22-23					1156.575 Kgs		144170.00 Dr
05-Apr-22	Deeptee Paper Mart	SALES INVOICE	K/ T-0009/ 22-23					55.00 Rm	1303.500 Kgs	160591.00 Dr
05-Apr-22	Thomson Press (India) Ltd. (100% EOU)	SALES INVOICE	K/ T-0010/ 22-23					9100.000 Kgs		1227408.00 Dr
05-Apr-22	Graphica Digital	SALES INVOICE	K/ T-0011/ 22-23					104.00 Pkt	1657.760 Kgs	234102.00 Dr
06-Apr-22	Birdhi Chand Girdhari Lal Papers P. Ltd.	SALES INVOICE	K/ T-0012/ 22-23					11182.000 Kgs		851621.00 Dr

Fig 1: Sales raw data

Processed Dataset:

Sales Register					
1-Apr-22 to 31-Mar-23					
Date		Particulars	Quantity	Alt. Units	Gross Total
01-Apr-22	April	Paper Hub	24.00 Pkt	588.000 Kgs	91025.00 Dr
01-Apr-22	April	Concept Advertising Agency	13.50 Rm	617.625 Kgs	75380.00 Dr
01-Apr-22	April	Indra Impex Corporation (Delhi)	17.00 Rm	806.630 Kgs	63464.00 Dr
01-Apr-22	April	Thomson Press (India) Ltd. (100% EOU)	14100.000 Kgs		1899408.00 Dr
04-Apr-22	April	Lustra Print Process Pvt. Ltd.	5021.354 Kgs		636263.00 Dr
04-Apr-22	April	SRV Services	12.00 Rm	284.400 Kgs	35675.00 Dr
04-Apr-22	April	Niyogi Offset Pvt. Ltd.	18.00 Rm	817.380 Kgs	101242.00 Dr
04-Apr-22	April	Archana Advertising Pvt. Ltd.	1156.575 Kgs		144170.00 Dr
05-Apr-22	April	Deeptee Paper Mart	55.00 Rm	1303.500 Kgs	160591.00 Dr
05-Apr-22	April	Thomson Press (India) Ltd. (100% EOU)	9100.000 Kgs		1227408.00 Dr
05-Apr-22	April	Graphica Digital	104.00 Pkt	1657.760 Kgs	234102.00 Dr
06-Apr-22	April	Birdhi Chand Girdhari Lal Papers P. Ltd.	11182.000 Kgs		851621.00 Dr
06-Apr-22	April	Varun Overseas	5740.500 Kgs		360380.00 Dr
06-Apr-22	April	Indra Impex Corporation (Delhi)	3008.416 Kgs		283683.00 Dr
06-Apr-22	April	Print Works (Prop: Mr. Santosh Kumar Patel)	1213.600 Kgs		128952.00 Dr

Fig 2: Sales processed data

Graphs and Charts created using this Dataset:

1. **Monthly Sales Trend:** The monthly sales of the firm was plotted as a line chart to understand the seasonality of Sales.
2. **Moving Average of Monthly Sales:** This was plotted to view the dips and spikes in Sales – to understand if the sales are uniform or are increased due to certain large orders.
3. **Lorentz Curve for Revenue:** Population Percentage vs the Revenue Percentage were plotted. This was to visualize the distribution of sales across the buyers, highlighting inequality or concentration. The curve plots the cumulative revenue (x-axis) against the cumulative population of buyers (y-axis). A line of equality was also plotted as an ideal plot to understand the deviation. The further the curve is from the diagonal line of equality, the greater the inequality (more explanation later).
4. **Party Analysis:** A bar chart visualizing the total purchase of top 25 buyers was plotted along with a line chart of the frequency of Purchases to understand the purchase landscape - if some buyers are frequent purchasers, while some others are infrequent purchasers but place large orders.

2) Stock Dataset

The preprocessed dataset contained merged columns as well as many empty values.

Data was provided for Opening Balance, Closing Balance, Inwards (Purchase), and Outwards (Sale).

487, EPIP, Sector 53, HSIIDC, Phase 3, Kundli Industrial Estate, Distt Sonapat, Haryana - 131028 Udyam Regn No: UDYAM-DL-10-0004798 FSC Certificate Code: TAH-COC-009299 Contact : 9810225567																	
Stock Summary 1-Apr-22 to 31-Mar-23																	
Indra Inpex Corporation (KUNDLI) - (from 1-Apr-2017) - (from 1-Apr-20)																	
1-Apr-22 to 31-Mar-23																	
Particulars	Opening Balance				Inwards				Outwards				Closing Balance				
	Quantity	(Alt. Units)	Rate	Value	Quantity	(Alt. Units)	Rate	Value	Quantity	(Alt. Units)	Rate	Value	Quantity	(Alt. Units)	Rate	Value	
100 Gem / 123 cm Gloss					16235.000 Kgs		102.10	1657593.50					16235.000 Kgs		102.10	1657593.50	
100 Gem / 129 cm Gloss					1959.000 Kgs		102.10	200013.90					1959.000 Kgs		102.10	200013.90	
100 Gem / 131 cm Gloss					2470.000 Kgs		102.10	252187.00					2470.000 Kgs		102.10	252187.00	
100 Gem / 145 cm Gloss					8368.000 Kgs		102.09	854289.12	1950.000 Kgs		116.00	226200.00	6418.000 Kgs		102.09	655213.62	
100 Gem / 58.4 cm Silk Q	4344.000 Kgs		68.40	297129.60					1084.000 Kgs		110.00	119240.00	3260.000 Kgs		68.40	222984.00	
100 Gem / 83 cm Matt	2029.000 Kgs		56.00	113624.00									2029.000 Kgs		56.00	113624.00	
100 Gem / 89 cm Gloss					1377.000 Kgs		104.00	143208.00					1377.000 Kgs		104.00	143208.00	
100 Gem / 91.2 cm Gloss					6468.000 Kgs		104.00	672672.00					6468.000 Kgs		104.00	672672.00	
100 Gem / 91.5 cm Gloss					5594.000 Kgs		104.00	581776.00	2840.000 Kgs		104.00	295360.00	2754.000 Kgs		104.00	286416.00	
100 Gem / 91 cm BILT Gloss	5408.000 Kgs		87.85	475062.80					2320.000 Kgs		87.85	203812.00	3088.000 Kgs		87.85	271280.80	
106 x 79 cm / 400 Gem S		1283.288 Kgs	1953.16	73494.92	79.75 Pkt	2721.888 Kgs	1947.95	155349.36		57.35 Pkt	1957.356 Kgs	3185.37	162960.88	60.00 Pkt	2047.800 Kgs	1949.62	116977.36
115 Gem / 128 cm Gloss		7199.000 Kgs	84.40	606219.60					2393.000 Kgs		84.40	201969.20	4786.000 Kgs		84.40	402250.40	
115 Gem / 90.6 cm Silk		1287.000 Kgs	45.62	58712.94									1287.000 Kgs		45.62	58712.94	

Fig 3: Stock raw data

Data Preprocessing - Data cleaning was done such as replacing blank values with the value 0, formatting all the numbers from text format to the appropriate format (Currency for the value in rupees).

In the dataset, the papers were categorized based on the type of the paper, and their brand. On talking to the owner of the company, various types were identified – Art paper, Digital Paper, Printing Paper, Coated and Uncoated Paper, Black Paper, Art Board etc. Some probing was also done from the website of the company. Based on this, following categories of paper were identified – Glossy, Silk, Matt, SBS, Printing Paper 48102900, FSC Mix, C1S, A, Uncoated, Black, Coated Printing Paper 481013, Kraft Paper, Paper Board 48109900. These were entered manually for around 250 entries.

Some of the terms here have the following meanings:

- SBS – Solid Bleach Sulphate (same as FBB - Folding Box Board), which is essentially packaging paper used for packing toothpaste and cosmetics.
- C1S – Coated one side; all other papers are considered to be Coated both sides C2S by default.
- A – Algro Design Duo; a both side coated paper usually used in pamphlets for automobiles and such.
- Paper Board – Paper used in Garment tags and Brochures.

Papers were purchased from various mills; following were identified – Algro Design Duo, APP, BILT, Burgo, Chinese, Hansol, Indra, Kinmari, Lumi, Ningbo, Pindo, Quatro, Sappi, and Sopo.

Processed Dataset

Particulars	Paper Encoding	Type of Paper	Brand	Outwards Value
100 Gsm / 123 cm Gloss	Gloss	Gloss	Unbranded	0
100 Gsm / 129 cm Gloss	Gloss	Gloss	Unbranded	0
100 Gsm / 131 cm Gloss	Gloss	Gloss	Unbranded	0
100 Gsm / 145 cm Gloss	Gloss	Gloss	Unbranded	226200.00
100 Gsm / 58.4 cm Silk Q	Silk Q	Silk	Quatro	119240.00
100 Gsm / 83 cm Matt	Matt	Matt	Sappi	0
100 Gsm / 89 cm Gloss	Gloss	Gloss	Unbranded	0
100 Gsm / 91.2 cm Gloss	Gloss	Gloss	Unbranded	0
100 Gsm / 91.5 cm Gloss	Gloss	Gloss	Unbranded	295360.00
100 Gsm / 91 cm BILT Gloss	BILT Gloss	Gloss	BILT	203812.00
108 x 79 cm / 400 Gsm S	S	SBS	Sappi	182680.86
115 Gsm / 128 cm Gloss	Gloss	Gloss	Unbranded	201969.20
115 Gsm / 90.6 cm Silk	Silk	Silk	Unbranded	0
115 Gsm / 91 cm Silk Q	Silk Q	Silk	Quatro	283716.00

Fig 4: Stock processed data

Graphs Created using this Dataset:

1. **Type of Paper Vs Sales (or Outwards Value)** – A bar chart was created to probe the highest selling paper types. Sales were scaled by one lakh for better visualization.

2. Segregation of Silk and Gloss (Highest Selling Papers) Based on Brand – After finding out the highest selling papers – Silk and Gloss, the brand most preferred by the customers were found out using a Stacked Bar chart.

3) Procurement Dataset

The data collected was for the duration of **April 2022 – March 2023** (One fiscal year).

The data was in the form of an excel sheet in a condensed format.

Indra Impex Corporation 487, EPIP, Sector 53, HSIIDC, Phase 3, Kundli Industrial Estate, Distt Sonapat, Haryana - 131028 Udyam Regn No: UDYAM-DL-10-0004798 FSC Certificate Code: RR-COC-000710 Contact : 9810225567												
Stock Group Summary												
Particulars	Indra Impex Corporation (KUNDLI) - (from 1-1-Apr-22 to 30-Apr-22			Indra Impex Corporation (KUNDLI) - (from 1-1-May-22 to 31-May-22			Indra Impex Corporation (KUNDLI) - (from 1-1-Jun-22 to 30-Jun-22			Indra Impex Corporation (KUNDLI) - (from 1-1-Jul-22 to 31-Jul-22		
	Closing Balance			Closing Balance			Closing Balance			Closing Balance		
	Quantity	Rate	Value	Quantity	Rate	Value	Quantity	Rate	Value	Quantity	Rate	Value
100 Gsm / 101.6 cm Silk Q	2935.000 Kgs	60.93	178829.55	2935.000 Kgs	60.93	178829.55	2935.000 Kgs	60.93	178829.55	2935.000 Kgs	60.93	178829.55
100 Gsm / 123 cm Gloss												
100 Gsm / 129 cm Gloss												
100 Gsm / 131 cm Gloss												
100 Gsm / 135 cm Silk												
100 Gsm / 145 cm Gloss							1177.000 Kgs	100.00	117700.00	1177.000 Kgs	100.00	117700.00
100 Gsm / 58.4 cm Silk Q	3260.000 Kgs	68.40	222984.00	3260.000 Kgs	68.40	222984.00	3260.000 Kgs	68.40	222984.00	3260.000 Kgs	68.40	222984.00
100 Gsm / 58.5 cm BILT Gloss	5486.000 Kgs	87.85	481945.10	5486.000 Kgs	87.85	481945.10	3489.000 Kgs	87.85	306508.65	1495.000 Kgs	87.85	131335.75
100 Gsm / 83 cm Matt	2029.000 Kgs	56.00	113624.00	2029.000 Kgs	56.00	113624.00	2029.000 Kgs	56.00	113624.00	2029.000 Kgs	56.00	113624.00
100 Gsm / 89 cm Gloss												
100 Gsm / 91.2 cm Gloss												
100 Gsm / 91.5 cm Gloss												
100 Gsm / 91 cm BILT Gloss	5408.000 Kgs	87.85	475092.80	3088.000 Kgs	87.85	271280.80	3088.000 Kgs	87.85	271280.80	3088.000 Kgs	87.85	271280.80
108 x 79 cm / 400 Gsm 0.5 S	14.20 Pkt	928.47	13184.28	14.20 Pkt	928.47	13184.28						
108 x 79 cm / 400 Gsm S	18.00 Pkt	1953.16	35156.93	18.00 Pkt	1953.16	35156.93	18.00 Pkt	1953.16	35156.93	18.00 Pkt	1953.16	35156.93
115 Gsm / 128 cm Gloss	4766.000 Kgs	84.40	402250.40	4766.000 Kgs	84.40	402250.40	4766.000 Kgs	84.40	402250.40	4766.000 Kgs	84.40	402250.40

Fig 5: Procurement raw data

This dataset was also binned using the type and brand of the paper. Many of the entries had the wrong formatting (String instead of numeric) which had to be corrected. Since huge numbers were being dealt with, entries were scaled by 1 Lakh for Value.

Cleaned Data:

Particulars	April	May	Jun	July	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Yearly Procurement (Value) in Lakhs
65 Gsm / 111 cm Silk	2.06	2.06	2.06	2.11	2.11	2.11	2.11	2.11	2.11	2.11	2.11	2.11	25.17
65 Gsm / 92 cm Bulky	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	9.50
70 Gsm / 101.6 cm Silk	9.41	9.41	9.41	9.41	9.41	9.41	9.41	9.41	9.41	9.41	9.41	9.41	112.93
70 Gsm / 58.4 cm Silk	1.87	1.87	1.87	1.87	1.87	1.87	1.87	1.87	1.87	1.87	1.87	1.87	22.48
70 x 100 cm / 070 Gsm Matt	10.33	10.33	10.33	10.33	6.16	5.61	5.61	5.61	5.61	5.61	5.61	5.61	86.77
58.5 x 87 cm / 80 Gsm Matt	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	2.89
58.5 x 88.9 cm / 80 Gsm Silk K	18.72	0.00	0.00	0.00	0.00	14.50	14.50	14.50	14.50	30.59	30.59	0.00	123.40
58.5 x 91.5 cm / 80 Gsm	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.13
59.5 x 91.5 cm / 80 Gsm Matt	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51	6.09
59 x 92 cm / 80 Gsm Silk	4.14	3.29	3.29	3.29	3.29	3.29	3.29	3.29	3.29	3.29	3.29	3.29	40.27
72.5 x 102 cm / 80 Gsm Silk K	9.56	9.56	9.56	5.60	5.60	7.95	7.95	7.53	7.65	7.65	7.65	5.84	91.72
72 x 102 cm / 080 Gsm Gloss	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	2.99
78.2 x 102 cm / 80 Gsm Matt	0.00	0.00	0.00	0.00	0.00	0.00	1.22	1.22	1.22	1.22	1.22	1.22	7.33
80 Gsm / 101.6 cm Silk	23.01	23.01	23.01	23.01	14.54	14.54	14.54	14.54	14.54	14.54	14.54	14.54	208.36
80 Gsm / 146 cm Gloss	2.11	2.11	2.11	2.11	2.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.56
80 Gsm / 58.4 cm Silk	5.09	5.09	5.09	5.09	5.09	5.09	5.09	5.09	5.09	5.09	3.83	3.83	55.35
80 Gsm / 78 cm Matt	1.22	1.22	1.22	1.22	1.22	1.22	1.22	0.00	0.00	0.00	0.00	0.00	7.33
80 Gsm / 88.9 cm Silk	16.12	16.12	16.12	16.12	16.12	16.12	16.12	16.12	16.12	16.12	16.12	16.12	193.49
80 Gsm / 92 cm Silk	25.80	25.80	25.80	25.80	25.80	25.80	25.80	25.80	25.80	25.80	25.80	25.80	309.58

Fig 6: Procurement processed data

Through this dataset, the procurement pattern of the firm was understood by plotting a stacked area chart of Procurement and Sales.

III. Results, Findings, And Interpretations

The main aim of the project is to optimize the Operational efficiency of the firm.

Operational efficiency is defined as the ability of an organization to reduce waste in time, effort, and materials as much as possible, while still producing a high-quality service or product.

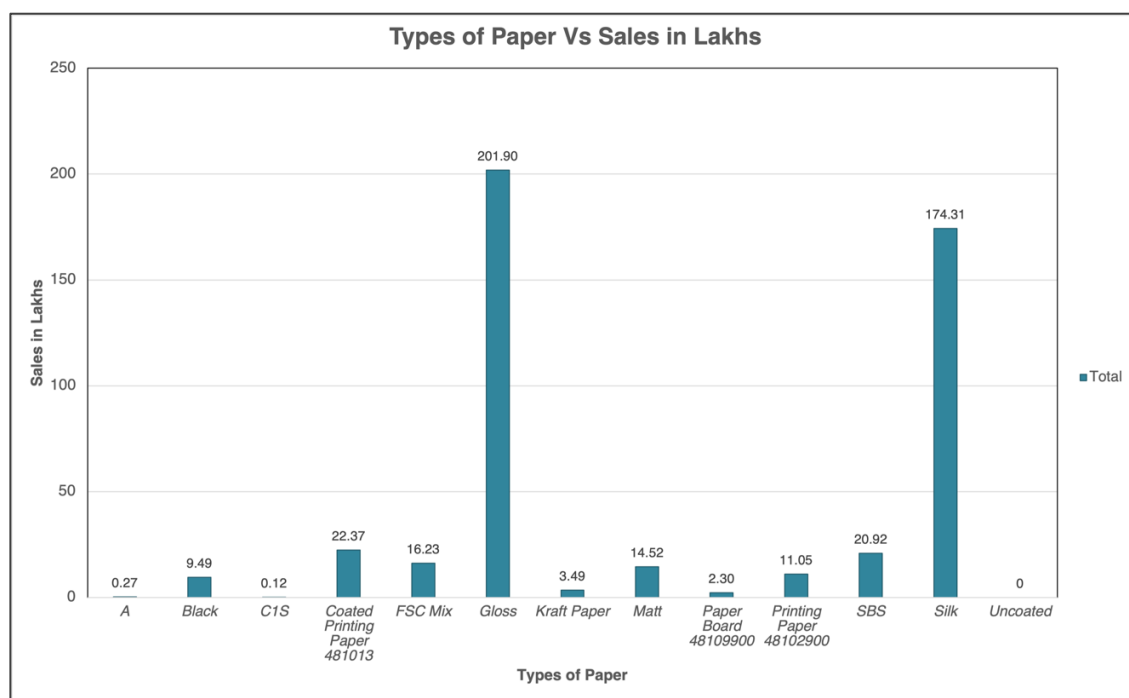
Through discussion and data analysis, many conclusions were drawn.

1. Descriptive Analysis

- Annual Turnover of the company = 10-25 Crore
- Annual Procurement of Paper Products = 101.449 Crore
- Average Monthly Sales in the year FY 2022-23 = 85 Lakh
- Total Opening Balance = 6,10,37,611.67 = 6.1 Crore
- Total Inwards = 6,38,09,269.37 = 6.38 Crore
- Total Outwards = 4,75,72,641.94 = 4.75 Crore
- Total Closing Balance = 8,45,82,941.35 = 8.45 Crore

2. Identifying Most Valuable Products and Brands

a. Type Vs Sales

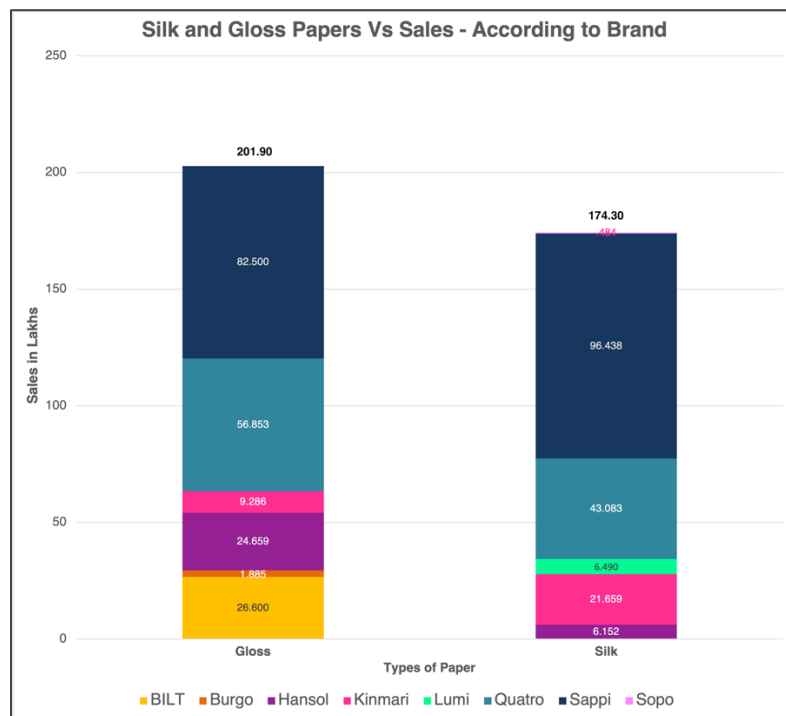


Graph 1: Types of Paper vs Sales in Lakhs

The bar chart here shows the clear dominance of two types of paper – Gloss and Silk in the Sales. Out of a total sale of around 4Cr, 2Cr and 1.7Cr is by the sale of Glossy and Silk Paper of various GSMs. **That is, out of 13 products, 2 products (i.e., around 15% of the total products) constitute 92.5% of the total Sales. Thus, making the Pareto Principle Evident.**

Clearly, the Sales landscape of Indra Impex is dominated by these two types of papers. An important point to be noted here is the fact that there are several types of subcategories of Gloss and Silk papers, based on GSM, dimensions, and brand. Out of these, we next analyze the Sales of Gloss and Silk based on Brand to identify which brands are mainly preferred by the customers for these two types of papers.

b. Type Vs Sales (Stacked Bar Chart for Brand)



Graph 2: Silk and Gloss Papers Vs Sales (Stacked Bar Chart for Brand)

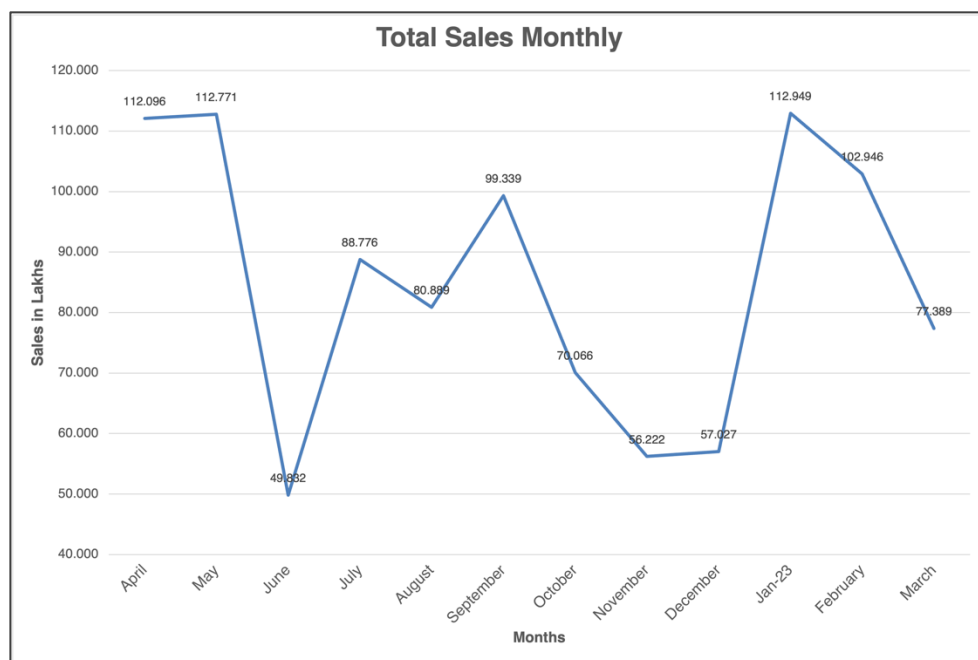
Based on this stacked Bar Chart we can observe the dominance of two specific brands – Sappi and Quatro.

- For Glossy papers:
 - Sappi and Quatro products account for 139.35 lakh of total sales of 201.90 Lakh, i.e., around 70%.
 - BILT is another major brand which accounts for around 13% to the total Sales. BILT is the only Indian Mill among these

- For Silk Papers:
 - Sappi and Quatro account for 139.521 Lakhs of total sale of 174.30 Lakhs, i.e. around 80% of the total sale of Silk papers.
 - Kinmari is another important brand which alone contributes to around 12% of sales of Silk Paper.

3. Seasonality of Sales

a. Monthly Sales



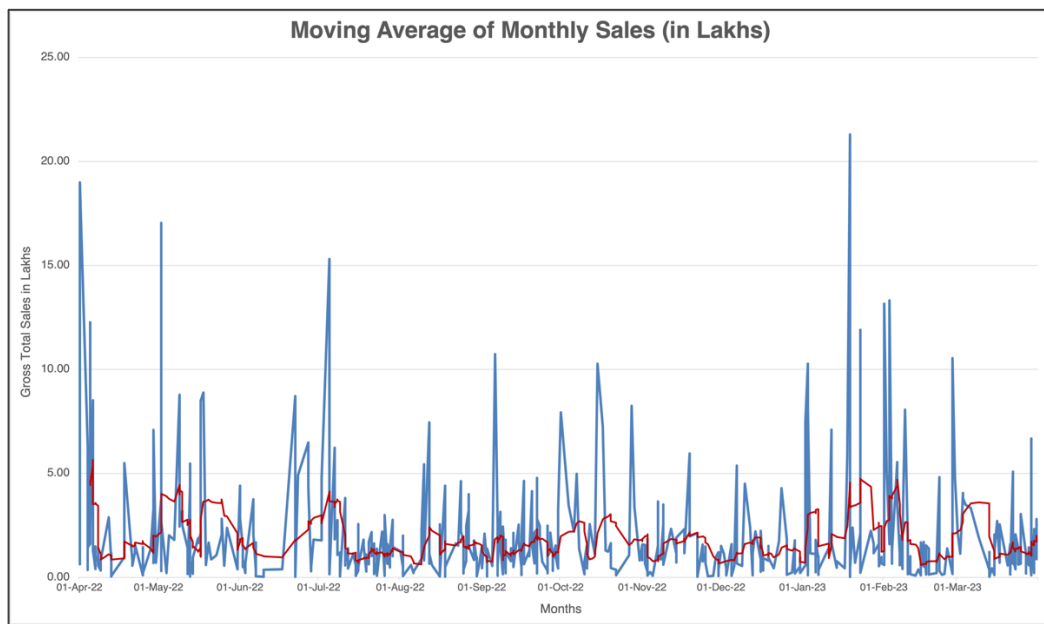
Graph 3: Total Sales Monthly

This graph clearly depicts the seasonality of sales in the paper industry. The trend of sales fluctuates throughout the year, peaking during the start of the fiscal year in April, followed by a dip in June, with a steady rise in the months of August and September, followed by another dip during October-November-December. This is followed by another steep rise in January, followed by a slow dip till March.

After speaking to the owner, the nature of the paper trading business expects seasonality, especially in the landscape of Indian Markets. For example, the sales of paper used for Wedding Cards (Such as Quatro Silk), peaks during the wedding season, but remains low during the other months. Also, the paper used in Calendars peaks during January.

The company can be recommended to keep the procurement low during the low sales months, to avoid unnecessary stockage. The company can also be recommended to ensure that stock is kept handy as per the season of the paper.

b. Moving Average of Monthly Sales

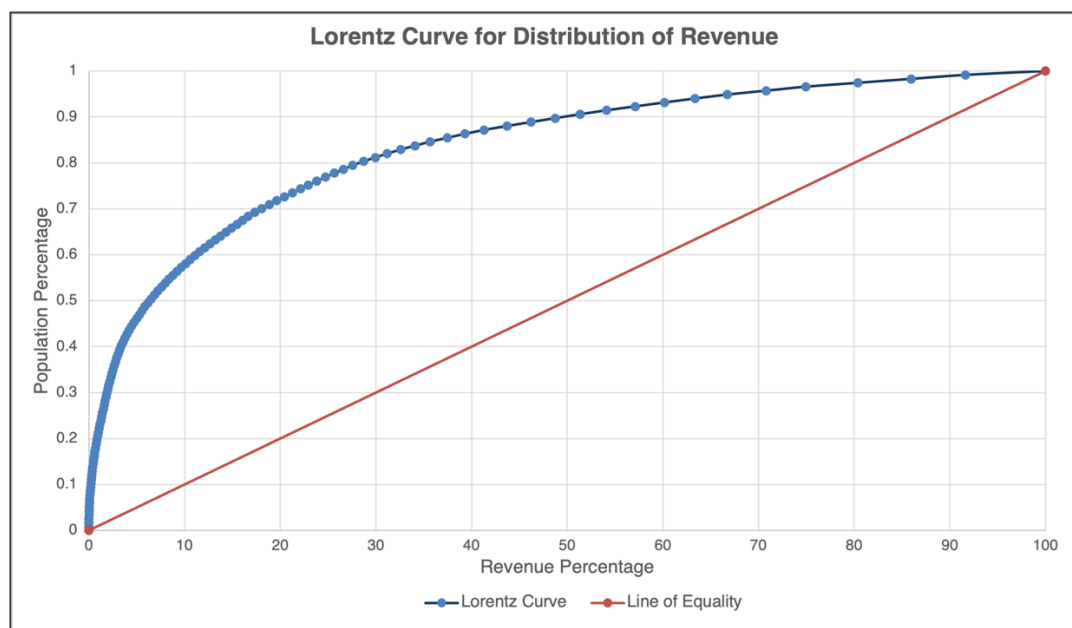


Graph 4: Moving Average of Monthly Sales (in Lakhs)

This graph mainly depicts how the sales are not uniform and smooth, but rather consist of some very high peaks (very high sale) that majorly define the shape of the seasonal trends graph. In absence of even one of these peaks, the shape of the seasonal graph may change drastically. Through this graph, we can set a goal to minimize the dips in sale, and we can note to sustain the large buyers and the frequent buyers to maintain the sales. This will be further analyzed in Party Wise Analysis.

4. Identifying Valuable Buyers and Inequality in Revenue Generation

a. Lorenz Curve



Graph 5: Lorenz Curve for Distribution of Revenue

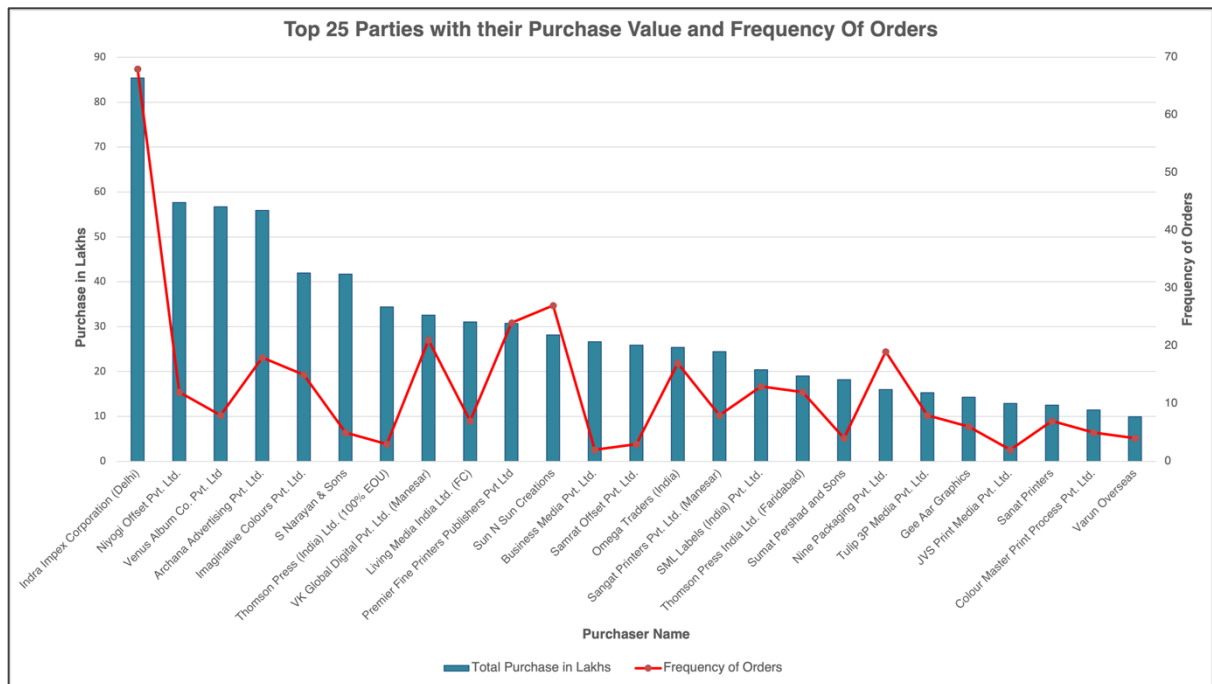
The Lorenz curve is a graphical representation of the distribution of income or wealth in a society. Basically, the farther the curve moves from the baseline, represented by the straight diagonal line, the higher the level of inequality.[1]

Here instead of analyzing the income, we have analyzed the purchase pattern of various companies to understand if there are frequent and almost equal buyers, or just a pool of some major buyers along with some occasional buyers. There are a total of 118 customers which purchased from Indra Impex in this particular year.

Interpretation - If it were an equalized curve, at 50% of revenue percentage, 50% population should have contributed. However, here we see that at 50% of the revenue, the population percentage is 90% which means that the bottom 50% of the revenue is generated by 90% of the buyers. While the top 50% of the sales is by the topmost 10% of the buyers (around 18-20).

Since the Lorenz curve is distant from ideal line of equality, we can conclude that the Sales landscape of the company is very unequal, and there is a heavy need to maintain good client relations with the topmost buyers.

b. Party Study – Sales and Frequency of Purchases

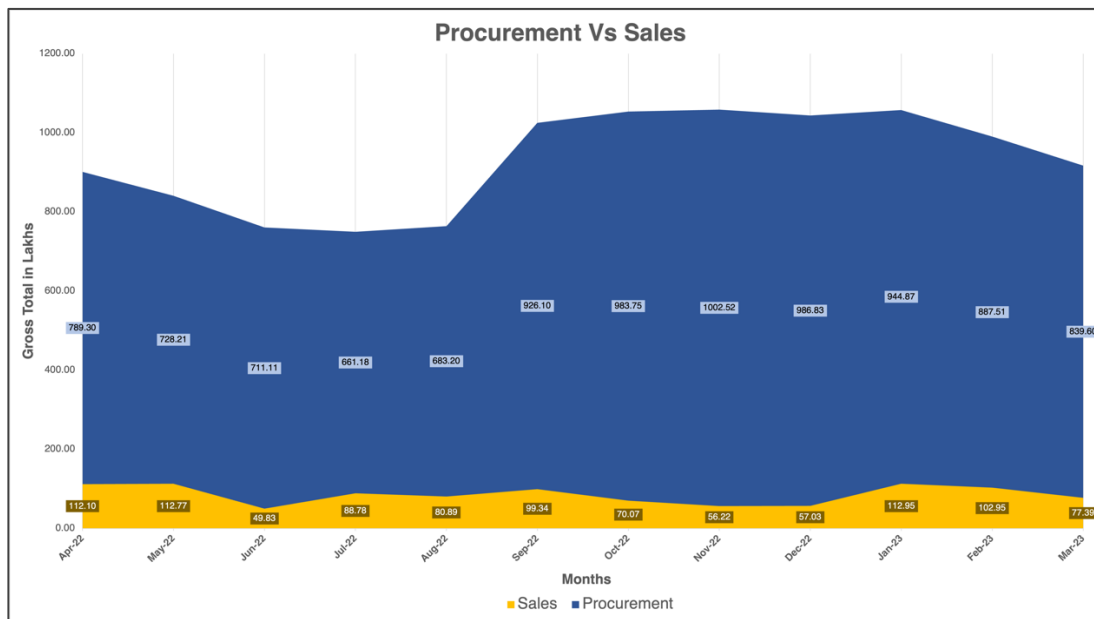


Graph 6: Sales and frequency of Purchases

The Topmost 25 buyers have been identified in this graph. As can be seen, Indra Impex Delhi is the topmost buyer, followed by Niyogi Offset Pvt. Ltd., Venus Album Co. Pvt. Ltd., and Archana Advertising Pvt. Ltd.

Top 25 Buying Companies constitute around 73% of the total sales.

5. Procurement Vs Sales (Stacked Area Chart)



Graph 7: Procurement Vs Sales

Interpretation – From this graph, the colossal difference between the procurement and the sales values over the entire year can be clearly visualized. This means that the company is procuring many products, however sales are not in tandem with the purchase frequency. After discussion with the owner of the firm regarding this huge gap, they said that it was due to the opportunistic purchases by the firm with the hope of making profits later, but most of the times, it leads to just excess inventory since the inventory turnover is low in the paper industry.

However, a good thing is that the shelf life of the paper products is very high, around a decade. Due to this fact, it was also understood that the procurement data varies drastically year to year. However, due to the availability of data of only a single year, year by year analysis was not possible.

Based on this data, the company is recommended to keep the procurement low in the upcoming years and first empty out the stock already available to save in the inventory management costs.

6. SWOT Analysis

Strengths –

- Diverse Range of Papers
- Good International Relations with international sellers
- Availability of Good Quality Imported Products
- Strategic Buyer Relationships

Weaknesses –

- Over stockage and inconsistent Inventory Management
- Over reliance on certain few buyers
- Fixed procurement prices since full dependence on certain few international Paper Mills.
- Since many products are imported, price hikes are often faced due to Geopolitical Issues.

Opportunities –

- Organized Inventory Management System to avoid over stockage and excess inventory costs.
- Shifting to Indian Mills of good quality to minimize shipping costs and maximize profits.
- Strategic Buyer Engagement to improve trust, and to sustain frequent customers.
- Better distribution system to increase customer base.
- Understand seasonality for better inventory management.

Threats –

- Low Demand and High Supply
- Due to international mills, disruption of imports due to geopolitical issues
- Digitization of Offices and various organisations leading to less demand for paper.
- Environmental Regulations.

IV. **Key Insights and Recommendations**

Key Insights

1. Out of 13 products, 2 products (i.e., around 15% of the total products), Glossy and Silk paper constitute 92.5% of the total Sales. Thus, making the Pareto Principle

Evident. Clearly, the Sales landscape of Indra Impex is dominated by these two types of papers.

2. Among these two papers, the brands that are majorly in demand are Sappi and Quatro (both South African brands). Their products are imported by the firm.
3. BILT is an Indian Mill, which also has a significant demand.
4. The sale of paper is highly seasonal in nature - fluctuating throughout the year. Peaks were observed in the beginning of the year, with a dip in the months of June-July and October-November.
5. The Sales are not uniform but rather consist of some large purchases, intermittently present between other small purchases – indicating the large range of sales value in the business.
6. Lorenz Curve for the distribution of revenue indicated a deviation from ideality. The bottom 50% of the revenue is generated by 90% of the buyers, while the top 50% of the sales is by the topmost 10% of the buyers (around 18-20).
7. The procurement Vs Sales data showed a huge gap between procurement and Sales, due to opportunistic purchases by the firm. Also, it was understood that the procurement pattern varies drastically from year to year.

Recommendations

1. Enhancing Operational Efficiency through Inventory Optimisation

- i. Improvement in Procurement System – Strategically stock products based on seasonal demand and avoid excessive stockage. A careful re-evaluation of available stock should be done in all warehouses, and excess stockage should be avoided henceforth. Capital could rather be invested in exploring and promoting other less sold product varieties.
- ii. Analysis of Seasonal Trends- As we analyzed there was a dip in the sales during certain months. We also know that majority of the Sales constitute of mainly two types of paper and around 10 major customers. Thus, during these months, other products and other customers could be focused on, to make the sales more uniform throughout the year and increase profits.

2. Expanding the procurement options to the Indian Market

The company mainly procures all its products from the international mills. Since the international market is highly unpredictable, Indian mills should be explored

more (the only Indian Mill used is BILT). Since imports take time, the company cannot explore the JLT (Just-In-Time) Principle with its current product landscape. With Indian Mills, and faster transport facilities, JLT principle, or procuring products on pre-order basis can be explored for additional profits. This will reduce the risks of dips in sales, while simultaneously achieving better inventory management through the JLT technique.

3. Product and Customer Focus

The company should put efforts in sustaining the topmost selling products and the topmost buyers to stabilize sales. Adapt to the buying pattern of frequent customers. Conduct meetings with top buyers to better understand their needs and strengthen the client-seller relationship. Moreover, additional discounts (after properly gauging the profit possibilities) can be given to frequent customers to maintain relationships.

After understanding the buying trends of various customers, occasional reminders could be sent to maintain loyalty.

4. Diversifying Product Portfolio

Consider diversifying the product varieties offered to mitigate the over dependence on certain few products. Instead of investing capital in buying excess stock of the same products, investment can be done to explore new products.

Partnerships can be built with other companies for entry into a new product market.

Discounts can be offered to initially expand into new product market.

V. Conclusion

To conclude, a comprehensive analysis of the B2B company's operations has been done, which has provided some valuable insights into its working, leading us to appreciate some of its strengths as a business while throwing light on various improvement areas.

The examination of the Sales, Stock and Procurement data led to some meaningful conclusions, through which practical solutions and recommendations were extracted for the firm's further operations.

Various innovative and new solutions were chalked out, some of which are – improving the firm’s inventory system through careful analysis of seasonal trends, possibility of expanding procurement to the Indian Market apart from the foreign imports, exploring the JLT inventory system with new products for additional profits during dip in sales, a major focus to be done to retain the valuable customers as they constitute majority of the revenue, recommendations on maintaining good client relationships were given, and lastly, expansion into new products was recommended.

Moving forward, this report will serve as a guiding document for Indra Impex’s strategic initiatives. The implementation of the recommended solutions, coupled with a commitment to adaptability in the dynamic market, will be instrumental in achieving long-term success. As the company refines its product offerings and explores new possibilities in the aspects of procurement and distribution, it is well equipped to not only increase its profits, but to emerge as one of the leading suppliers of paper in the defined region, with its timely delivery, unique approaches, and trust with the customers. This report provides a beginning for informed decision-making and sustained growth in the coming years.

VI. **References**

Table 1: Documents for the proof of originality

Name	Type	Link
A Letter bearing the company’s letterhead permitting the use of the data	PDF	Link
Pictures of the site visit of the company	Images	Link
Entire BDM Folder link of Google Drive with all datasets	Drive Link	Link