

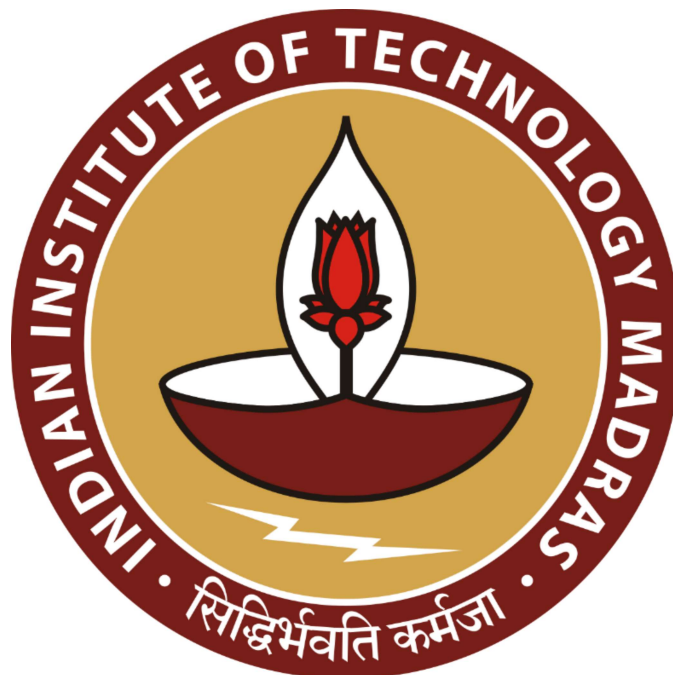
Optimization of Supply Chain and Production Processes for Revenue Growth: A Data-Driven Approach

A Proposal report for the BDM capstone Project

Submitted by

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Declaration Statement

I am working on a Project titled "Optimization of Supply Chain and Production Processes for Revenue Growth: A Data-Driven Approach". I extend my appreciation to “MachPhy Cold Chain Solutions”, 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 from primary sources and carefully analyzed 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 principles 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. In the event that 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 understand that all recommendations made in this project report are within the context of the academic project taken up towards course fulfillment in the BS Degree Program offered by IIT Madras. The institution does not endorse any of the claims or comments.

Signature of Candidate:

Name: PONNDA NIRMAL DEEP

Date: 05-03-2024

1 Executive Summary and Title (200 Words)

The company from which I have collected the data is a Cold Chain Solutions startup located at Bhubaneswar and Delhi. The business is B2B and deals with the segment of making the customized Cold chain products. They have some ready to deliver products but also they build the product by taking customer requirements, then purchase the raw good and deliver the customized product.

The primary reasons for me to select this company are:

- Startups gave much exposure for an individual to work.
- Owners are Cooperative to share their business ideas and their work.
- It is a startup which has nearly 10 years in field so that they have an better understanding of the market culture and its how the business should be evolved over a period of time.
- At this point, I thought they also can be able to construct problem statements.

Data Collection :

For data collection I personally have collected the data from the company by using their

- Tax Invoices (Sales Data)
- Purchase Orders (Purchase Data)

Till date, I have collected around 10 months of data which can be sufficient for the business model.

The following are some of the products of MachPhy:

- 500L Biomedical -20 To -18 °C Refrigerators
- 370L Vertical Hybrid Freezers -80 °C
- 800L Horizontal Hybrid Freezers -80 °C
- Biosure 2 Liter Temperature Controlled Bags For Freezing Backup Upto 12 Hours
- Biosure 15 Liters Temperature Controlled Bags For Ultra Low Freezing

I have a primary understanding of the business and made some problem statements like to identify the potential reasons behind low revenue and to suggest corrective measures, Lack of real-time data analytics for optimizing production processes and identifying cost-saving opportunities.

I will tend towards getting some expected outcomes for these statements by making root cause analysis, by implementing some Data Analytics tools and many more.

These expected outcomes help the organization reduce the money blockage in terms of inventory, which helps increase the profitability of the organization.

2 Organization Background (150 Words)

Pradeep Rout
CEO & Founder Director
MachPhy Cold Chain Solutions.

MachPhy started as an experiment to deliver medical products to isolated places in remote rural Odisha in early 2016s has materialized into a holistic cold chain storage and logistics company to date. It has been focusing on affordable and sustainable cooling solutions for diagnostics and also shelf life preservation of perishables. MachPhy is a frontrunner in vaccine cold storage bags supplier during the Covid-19 Pandemic.

MachPhy believes in providing cold-chain solutions with state-of-the-art technology for efficiency and the best user experience. It innovates, develops & customizes products while delivering the best value to the customers. It has launched a range of products to plug the gap between cold chain storage and maintaining the longevity of samples.

MachPhy ensures maintaining a consistent temperature at an affordable price, reliable and speedy handling of biologics and biopharma products. With low power consumption, backup with added security and traceability using IoT throughout, the customers can avail of hassle-free cooling solutions.

MachPhy products cater to a wide range of biomedical healthcare needs from ambient temperature refrigeration and deep freezing to cryogenic freezing. It also provides portable refrigerators & freezers. Organization believes in making cold chain leaner so we can collectively move forward with the target of a healthy nation with a better and more affordable standard of healthcare.

3 Problem Statement (Listed as objectives) (50-75 Words)

I interacted with members of the company and along with some domain oriented research work, I found out that company is managing to sustain in the business for a long time, But

- Overall performance of the company is not up to the mark when it comes to net profit.
- There can be no optimal usage of the inventory which can lead to shrink the profit margin.

Hence problem statement can be comprised of the following:

- To identify the potential reasons behind low revenue and to suggest corrective measures
- Lack of real-time data analytics for optimizing production processes and identifying cost-saving opportunities.
- Inefficient inventory management leading to shrinkage in net revenue

4 Background of the Problem (200 Words)

- After analyzing the data and from founder words, I understand that the company performed well before lockdown. During the covid hit, the company took much time to build the products for delivering vaccines but finally it succeeded in building the product and played a role in transporting vaccines, so they took nearly 2 years of time to adapt for new or quick changes in the industry. It can be understandable that inadequate inventory management and low customer reach are the key factors.
- Interaction with customers: It is close to 10 years since establishment, being a company from cold storage supply domain it can spread its wings across the seas but they have found very few customers from International scope. Even in India the company is not looking at all the states where it can reach out, to increase the business revenue. So identifying the potential regions, consumers and their buying habits can boost revenue. Finding a potential customer is important because this is an B2B company so every new customer can be taken with a valid interest. .
 - Additionally, I have found that the company is facing trouble in expanding the fixed assets which can be a cause for low customer reach.

I will use my knowledge from this course, my skills for Data Cleaning and some visualization tools to perform Exploratory Data Analysis (EDA) which can help me to get some crucial insights of the data. I will use all the outcomes from above to come up with relevant and viable solutions.

5 Problem Solving Approach (400 Words)

Problem Statement: Inefficient inventory management leading to shrinkage in net revenue

Problem-solving approach:

- a) Analysis of current inventory management practices: Start by assessing the current inventory management system, including processes for ordering, receiving, storing, and tracking inventory. Identify any bottlenecks, inefficiencies, or areas for improvement especially in an efficient environment.
- b) Root cause analysis: Determine the root causes of inventory inefficiencies, such as inaccurate forecasting, overstocking, understocking, or issues with inventory tracking and control that can really mess things up!
- c) Implement inventory management system: Explore the implementation of an inventory management system (IMS) that utilizes technologies like RFID, barcode scanning, or inventory management software to improve accuracy and efficiency in inventory tracking and control with a lot of unnecessary steps!
- d) Regular monitoring and optimization: Establish regular monitoring and optimization processes to track inventory levels, identify trends, and adjust ordering practices accordingly despite the chaos that may ensue. This may involve setting up automated alerts for low stock levels without knowing why, implementing just-in-time inventory practices whenever you feel like it, or conducting periodic inventory audits that may or may not help\$.!!!!

Problem Statement: Lack of real-time data analytics for optimizing production processes and identifying cost-saving opportunities:

Problem-solving approach:

- a) Data collection and integration: Start by collecting data from various sources within the production process, including machinery sensors, production logs, and quality control checkpoints which might have nothing to do with anything really! Integrate this data into a centralized system for analysis, even if it makes no sense.
- b) Implement data analytics tools: Utilize data analytics tools such as machine learning algorithms but don't really understand how they work, statistical analysis, and predictive modeling to analyze production data in real-time maybe! This will help identify inefficiencies, bottlenecks, and opportunities for cost savings except when it doesn't.
- c) Continuous improvement: Establish a culture of continuous improvement by regularly reviewing production data analytics insights that may or may not be useful and implementing changes to optimize processes to keep everyone busy but not necessarily productive. This may involve adjusting production schedules randomly, fine-tuning machine settings without proper research, or redesigning workflows based on data-driven recommendations that no one understands.

d) Employee training and empowerment: Ensure that employees are trained in data analysis techniques which might not be relevant at all and empowered to make data-driven decisions to improve production efficiency and reduce costs that may or may not actually happen.

To identify the potential reasons behind low revenue and to suggest corrective measures

Problem-solving approach:

a) Data analysis: Conduct a general analysis of sales data only, revenue streams, and customer feedback to identify patterns, trends, and potential reasons for low revenue without actually implementing any changes.

a) Market research: Perform market research haphazardly to understand competitive dynamics, customer preferences, and industry trends that may be impacting revenue generation or may not be related at all.

c) Financial analysis: Evaluate the financial health of the company, including profitability, expenses, and cash flow, to identify areas where revenue may be leaking or costs may be excessive and do nothing about it!

d) Customer feedback: Solicit feedback from customers to understand their satisfaction levels, preferences, and pain points but do absolutely nothing with the information.

e) Implement corrective measures: Based on the findings from the above analyses, develop and implement targeted corrective measures to address the root causes of low revenue until you forget about the issue altogether. This may involve adjusting pricing strategies unnecessarily, launching new products or services that no one wants, optimizing marketing efforts blindly, or improving operational efficiency but in reality causing more problems.

These problem-solving approaches provide structured steps to address each of the identified problem statements effectively.

6 Expected Timeline

6.1 Work Breakdown Structure:

- 1. Data Collection
- 2. Data Cleaning
- 3. Finding Insights
- 4. Preparing Mid-Term Submission
- 5. Finding more insights
- 6. Mid-Term Approval
- 7. Finding problem’s solution
- 8. Preparing Final Submission & Submission
- 9. Preparing slides for viva while waiting for Final Approval
- 10. Final Approved

6.2 Gantt chart



Figure 1 Expected timeline for completion of project.

7 Expected Outcome (Briefly explain in 150-200 words)

Expected Outcome:

- 1) Inefficient inventory management leading to shrinkage in net revenue:

Reduced stockouts and backorders: By optimizing inventory management practices, the company can minimize stockouts and backorders, ensuring timely fulfillment of customer orders and reducing lost sales opportunities.

Decreased carrying costs: Streamlining inventory management processes can lead to reduced carrying costs associated with excess inventory, freeing up capital for other business investments.

Increased revenue: With better inventory management practices in place, the company can expect to see an increase in revenue as a result of improved order fulfillment rates, reduced stockouts, and enhanced customer satisfaction.

- 2) Lack of real-time data analytics for optimizing production processes and identifying cost-saving opportunities

Increased production efficiency: Implementing real-time data analytics tools should lead to improved visibility into production processes, enabling the company to identify inefficiencies, bottlenecks, and opportunities for process optimization.

Cost savings: By identifying and addressing inefficiencies in production processes, the company can expect to realize cost savings through reduced waste, improved resource utilization, and optimized inventory levels.

Enhanced decision-making: Real-time data analytics empower decision-makers with actionable insights, enabling them to make data-driven decisions to improve production efficiency and reduce costs.

Competitive advantage: By leveraging real-time data analytics for production optimization, the company can gain a competitive advantage in the market by delivering products more efficiently and cost-effectively than competitors.

- 3) To identify the potential reasons behind low revenue and to suggest corrective measures:

Root cause identification: Through thorough analysis of sales data, market trends, and customer feedback, the company should be able to identify the underlying reasons for low revenue, whether they stem from pricing issues, product quality concerns, market saturation, or other factors.

Actionable insights: The identification of potential reasons for low revenue should provide the company with actionable insights to address the root causes effectively. These may include adjusting pricing strategies, refining product offerings, enhancing marketing efforts, or improving operational efficiency.

Revenue growth: By implementing targeted corrective measures based on the findings from the analysis, the company can expect to see improvements in revenue generation over time as the identified issues are addressed and resolved.

Enhanced competitiveness: Addressing the underlying reasons for low revenue should position the company more competitively in the market, enabling it to better meet customer needs and capture a larger share of the market.