

Report On

**Design & Implementation of Software-based Supply Chain
Management System for Improved Procurement Process, Product
Tracking and Project Planning**

By

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An internship report submitted to the Brac Business School in partial fulfillment of the
requirements for the degree of
Master of Business Administration

Brac Business School
Brac University
January 2025

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Declaration

It is hereby declared that

1. The internship report submitted is my/our own original work while completing degree at Brac University.
2. The report does not contain material previously published or written by a third party, except where this is appropriately cited through full and accurate referencing.
3. The report does not contain material which has been accepted, or submitted, for any other degree or diploma at a university or other institution.
4. I/We have acknowledged all main sources of help.

Student's Full Name & Signature:

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21364121

Supervisor's Full Name & Signature:

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Letter of Transmittal

Dr. Zaheed Halim
Associate Professor,
Brac Business School
Brac University
Kha 224 Pragati Sarani, Merul Badda , Dhaka 1212, Bangladesh

Subject: Submission of Internship my Report.

Dear Sir,

This is to inform you that I have finished my internship report that was required to be completed in order to completion of my MBA program from Brac University's. I am lucky to have a skilled and productive team of professionals working for SARBS Communications Ltd. I have the chance to collaborate with them in order to efficiently understand their workflow and came up with a solution that can improve their supply chain process.

I have attempted my best to finish the report with the essential data and recommended proposition in a significant compact and comprehensive manner as possible.

I trust that the report will meet the desires.

Sincerely yours,

Syed Shafquat Hossain
21364121
BRAC Business School
BRAC University
Date: January 12, 2025

Non-Disclosure Agreement

This agreement is made and entered into by and between SARBS Communications Ltd. and the undersigned student at Brac University for the attention of the unlawful exposure of the organizational confidentiality.

Moreover, the purpose of this agreement is to protect the confidential and proprietary information disclosed to Brac University during the internship period.

Syed Shafquat Hossain

21364121

BRAC Business School

BRAC University

Date: January 12, 2025

Acknowledgement

Sincere gratitude goes out to my colleagues in the Supply Chain Management department and Information Technology department for helping me stay up to date with the workflow during my internship period, which was something I had never experienced before. SARBS Communications Ltd. has very much friendly environment where I had received full support from my colleagues.

Moreover, my sincere gratitude is extended to Mosaddek Khan Rana, Assistant Manager, Supply Chain Management, who is my immediate supervisor at SARBS Communications Ltd. He was a mentor to me while I was an intern in the company. He had provided his full support in my internship period and I had learnt a many important aspects of supply chain management process.

Lastly, I am grateful to my academic supervisor Dr. Zaheed Halim, Associate Professor, Brac Business School and co-supervisor Dr. Md Shamimul Islam, Associate Professor, Brac Business School for their great support to complete my internship report. Their guidance has helped and encouraged me to finish this report.

Executive Summary

This report highlights my internship at SARBS Communications Ltd., focusing on improving supply chain processes through software-based system development. SARBS has become a leading provider of power solutions in Bangladesh and they are dedicated to operational excellence.

My project in the inter period aimed to address inefficiencies in procurement, real-time tracking, and inventory management, while reducing risks of theft and data manipulation in warehouse log keeping. With the help of in-house software team, we have developed a user-friendly supply chain management system to optimize supply chain process, procurement process, product tracking and warehouse management.

My contributions included requirement analysis, process mapping, user training and guiding the software team. In order to guarantee alignment with operational objectives, I worked in collaboration with the in-house software team. The supply chain process accuracy, efficiency, and transparency all had increased when it was put into place at the end of the project.

This initiative supports SARBS's dedication to innovation and expansion by showcasing how technology can update conventional supply chain procedures. Moreover, it offered insightful information on supply chain management and how technology can be used to solve operational problems.

Keywords: Procurement process improvement, software-based supply chain process, Inventory management, real-time product tracking, process optimization.

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List of Acronyms

UX	User Experience
PO	Purchase Order
LC	Letter of Credit
KPI	Key Performance Indicator
OEM	Original Equipment Manufacturer
DC	Direct Current
CFR	Cost and freight
DDP	Delivered Duty Paid
SAP	Systems Applications and Products
B2B	Business-to-business
UI	User Interface
PI	Proforma Invoice
ETA	Estimated Time of Arrival
ID	Identification
SAQ	Site Acquisition
ERP	Enterprise Resource Planning

Chapter 1: Overview of Internship

1.1 Student Information

Name: Syed Shafquat Hossain

ID: 21364121

Program: Masters in Business Administration (MBA)

Major: Operation & Supply Chain Management

1.2 Internship Information

1.2.1 Period, Company Name, Department/Division, Address

Period: 01/01/2024 till 30/03/2024

Company Name: SARBS Communications Ltd.

Department: Supply Chain Management

Address: House-03, Road-13, Gulshan-01, Dhaka-1212

Company Logo:



1.2.2 Line Manager

Name of Line Manager: Mosaddek Khan Rana

Designation: Assistant Manager

Department: Supply Chain Management

1.2.3 Job Scope – Job Description/Duties/Responsibilities

Throughout my internship period in SARBS Communication Ltd. I work under the Supply Chain Management Department and as an intern in this department my role was,

- Analyze the software requirement and prepare project plan, work flow, feature list of software
- Prepare a map to improve current supply chain process including product tracking, procurement process improvement, inventory record keeping.
- Identifying the feature that will improve the supply chain process by software-based system
- Collect data from procurement team, project team, warehouse team, audit team to develop the supply chain software.
- Research about the user experience (UX) insight to develop a user-friendly software.
- Monitor the software development process on regular basis.
- Conduct weekly meeting with user team and software team.
- Testing software on regular basis and identifying the problem.
- Train the user team on using the software.
- Provide continuous support to the user team for software adaptation.
- Provide post-implementation support to the software user team.

In my internship period I tried my best to full support the company to develop the software that can help to improve the supply chain process of the company.

1.3 Internship Outcomes

1.3.1 Student's Contribution to the Company

Within my internship period, I was assigned to develop a software with the in-house software team. I prepared the outline with the help of my line manager by which foreign procurement can purchase goods from the foreign market. Moreover, I worked with software team and warehouse team to develop a software by which the warehouse team can easily keep record of the goods that are stored in the warehouse.

1.3.2 Benefits of the Student

In my internship period I have learned many new things. The best part of my internship period was, applying the process in my practical life, that I have learnt during my MBA program. I had gathered knowledge about procurement process, payment process, steps of importing goods etc. Besides, throughout my internship period I have learned the corporate behavior, importance of following the chain of command, professional way of communication both inside and outside the office premises. Moreover, I have learnt intermediate level of Microsoft Office that includes MS Word, MS Excel, MS PowerPoint, MS Project etc. I have also learned how to communicate through email in professional way. Furthermore, during my internship period I have learnt how I can express positive attitude towards my colleague and seniors in the office environment.

Chapter 2: Organization Part

2.1 Company Overview

SARBS Communications Ltd. is one of the well reputed telecom service provider company in Bangladesh. The company has started its journey in 2011 by installing telecom equipment in telecom sites. Gradually SARBS has earned well recognition by telecom operators and tower companies and started to expand its business. In 2015 SARBS Communications Ltd. introduced Lithium-ion battery in Bangladesh telecom market. Whereas, all the telecom operator and tower companies used Lead Acid battery, which require more space and less service life. Since, 2015 SARBS Communications Ltd. started to supply Lithium-ion Battery in telecom market and gradually captured over 90% market share till today. Besides, they have added more products in their product line such as DC Power System, Telecom Outdoor Cabinet, Solar Energy Solution etc. Moreover, SARBS Communications Ltd. has expand its business in Singapore and Myanmar.

Currently, SARBS Communications Ltd. has more than 850 qualified employee all over Bangladesh. Yearly turnover of SARBS Communications Ltd. was 260 crore BDT in the year 2023. The company is planning on expanding their business in Thailand, Malaysia and Philippine in next 5 years.

The company's ownership structure includes Chairman and Managing Director as shareholders, both of them holds equal shares of the company. Major decision of the company is made by the Chairman and Managing Director. These individuals oversee strategic decisions, operational policies and business growth of the company. Moreover, department heads of key areas such as, operation and project management, accounts and finance, solution and design, research and development, civil construction, business development, human resource management departments contribute insights to support decision making.

2.1.1 Company's Mission & Vision

The main mission of SARBS Communications Ltd. is

“Empowering local manufacturing, value proposition & skilled manpower development”

The company's vision is

“To lead intelligent power & efficient construction market”

2.1.2 Business Model of SARBS Communications Ltd.

The business strategy of SARBS Communications Ltd. includes supplying power solutions to telecom operators and tower company, which creates value for its customers. With an emphasis on quality, innovation, and sustainability, its operations are designed to satisfy the expanding needs of the telecom, renewable energy sector.

The business model canvas of the company is given below,

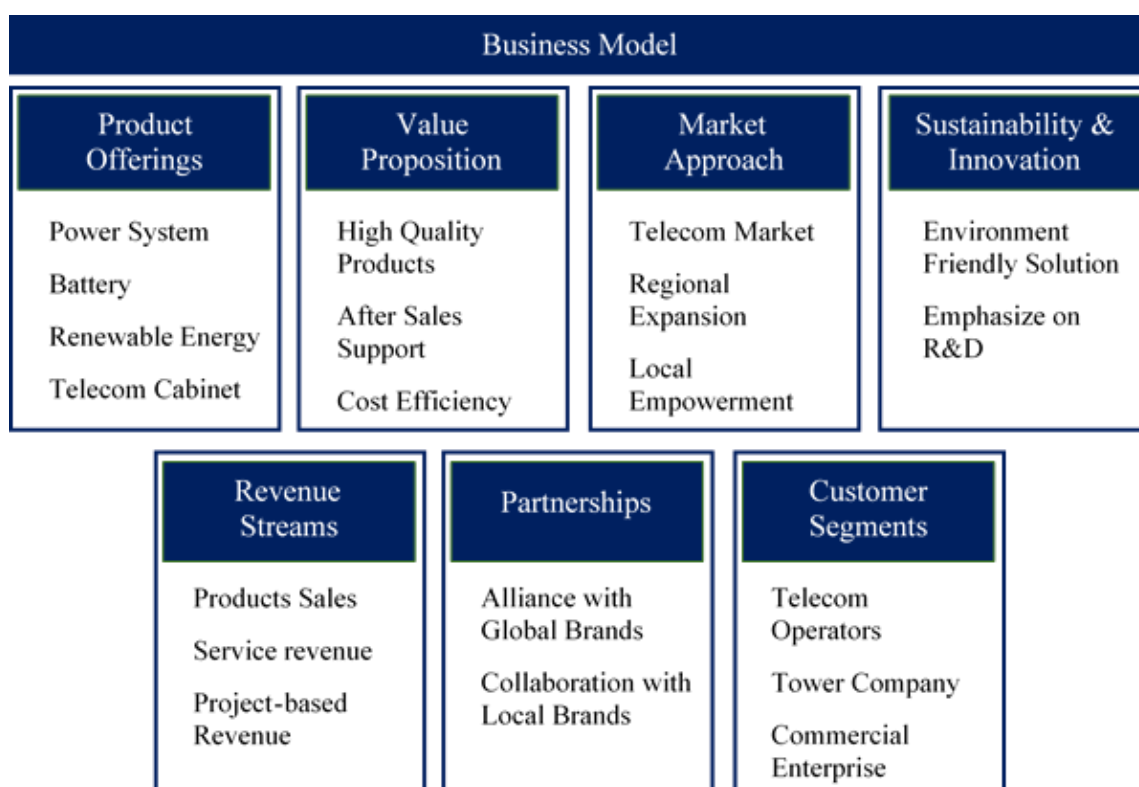


Figure 2. 1 Business Model Canvas

2.2 Management Practices

2.2.1 Organizational Structure

The organizational structure of SARBS Communications Ltd. follows hierarchical structure with distinct divisions according to strategic priorities and functional operations. Although, the company influence democratic formation for specific department like Solution & Design and R&D department. Employee of these departments are welcomed to share their thought with top management. General organizational structure of the company is given below:



Figure 2. 2 Organizational Structure

2.2.2 Human Resource Management

SARBS Communications Ltd. has more than 850 all over Bangladesh. All the employees KPI are monitored by human resource department very strictly. Human resource department collects individual performance data on regular basis. As SARBS is committed to quality service, good performance of employee is very important. HR department often give surprise visit to sites to analyze the workmanship of field resources. HR department is also responsible to arrange training session for the employee on regular basis to improve their skills. Furthermore, appraisal for employee is also ensured by this department.

2.3 Marketing Practices

The marketing practices of SARBS Communications Ltd. are based on unique nature of the telecom market in Bangladesh, where customers are well established, and the business model focuses on tender participation. As a result, SARBS Communications Ltd. marketing strategy is based on relationship marketing and solution-oriented practices to ensure its offerings align with customer requirements. Common marketing practices of SARBS Communications Ltd. is given below,

2.3.1 Customer Relationship Management

SARBS maintains strong and long-term relationships with its customers, that includes telecom operators like Grameenphone, Robi, Banglalink, Teletalk and tower companies like EDOTCO, Summit Tower Ltd., American Tower Company (previously KTBL), Frontier Tower Bangladesh.

- The marketing team frequently visits customers premises or communicate over phone to build trust and good relation.

- Visits focus on identifying current and future product or service requirements, allowing SARBS to develop its solutions accordingly.

2.3.2 Tender-Oriented Marketing Approach

Telecom operator and tower companies are not allowed to purchase product without tender. As a result, each time there is product or service requirement they initiate tender for it. SARBS Communications Ltd. participates in this tender along with its competitors.

- **Proposal Preparation:** SARBS prepares technical and commercial proposals to participate in tenders, ensuring full compliance with customer specifications.
- **Competitive Advantage:** Sales and marketing team always tries to collect insights about customer requirements by interacting with them before tender. SARBS can develop or source innovative products that meet with customer requirements as a result, it can enhance chances of winning tenders.

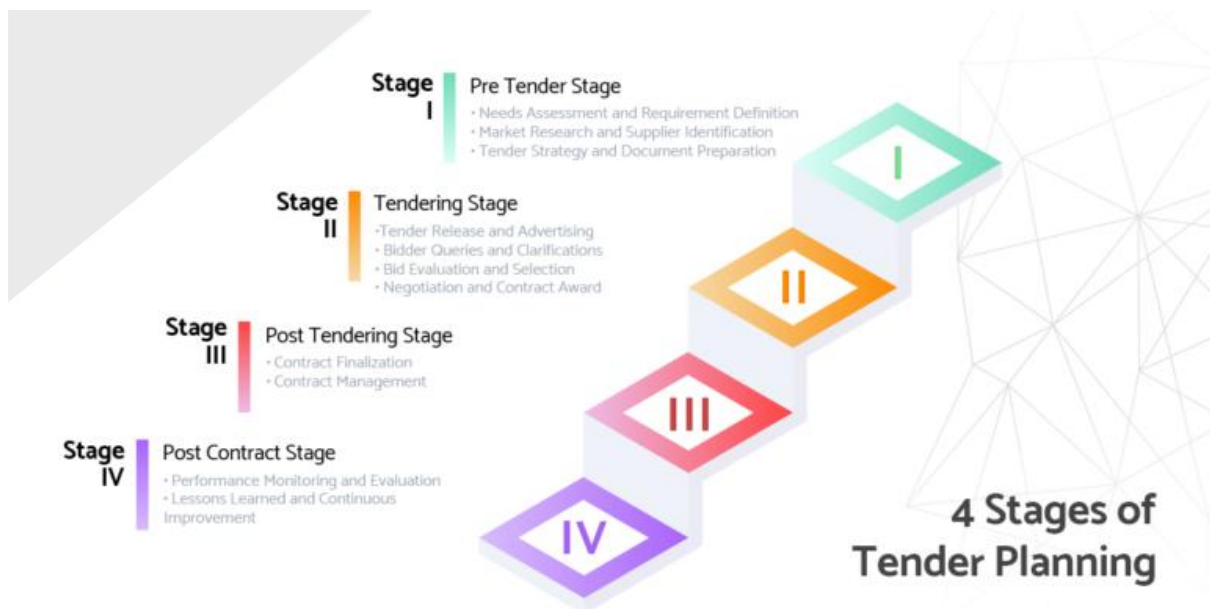


Figure 2. 3 Stages of Tender Planning

2.3.3 Market Research and Competitor Analysis

SARBS continuously monitors the market and competitor activities, to stay competitive in the market.

- **Collecting Market Insights:** Marketing teams collect information about competitors' products, pricing, and strategies through customer feedback.
- **Adapting Strategies:** Marketing team use this intelligence to refine proposals and pricing for future tenders according to customers requirement.

2.3.4 Emphasis on After-Sales Support

SARBS's marketing strategy includes promoting its strong after-sales service as a key value proposition towards customer.

- **Proactive Support:** Highlighting its after sales support and maintenance support as a major part of its services.
- **Customer Satisfaction:** SARBS always ensures its existing customers are satisfied to encourage repeat business and long-term collaboration.



Figure 2. 4 Strong After Sales Service

2.3.5 Brand Positioning

SARBS positions itself as a trusted partner rather than just a vendor. The company focuses on quality, reliability, and innovation.

- SARBS Communication Ltd. establish itself as a solution provider rather than a product seller.
- The company focuses on renewable energy solutions and environmentally friendly practices to align with customers' sustainability goals.

2.4 Financial and Accounting Practices

In terms of financial and accounting practices SARBS Communications Ltd. focuses on maintaining proper financial efficiency to support its tender oriented business model. Since 2011 SARBS Communications Ltd. has started its journey and slowly became well reputed company in the telecom field. Last year (2022-2023) SARBS has generated revenue of 260 crore Taka (figure 2.5), which is 18% more than previous year. The company generates its revenue through selling products and services both. Around 50% of the revenue is earned by selling products to tower company, as they purchase broad line of products from SARBS and 20% revenue comes from selling products to telecom operators and the rest of revenue comes from services.

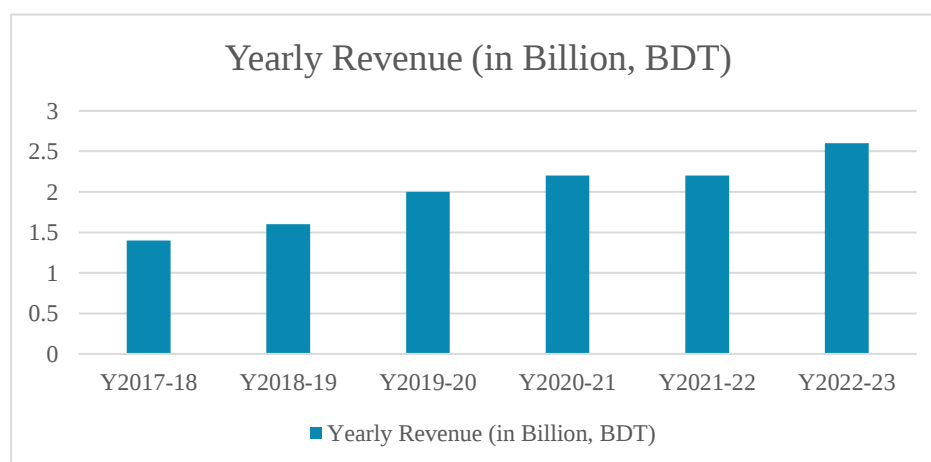


Figure 2. 5 Increase in Yearly Revenue

Payment terms in telecom projects are good, although no advance payment is made by the customer but 100% payment is made within 45 to 60 days after completing the project successfully. SARBS has to incur a good amount of operational cost due to its large number of employees. As a result, by maximizing direct and indirect costs, utilizing strategic supplier relationships, and using competitive price tactics, SARBS places a high priority on cost control. In order to maintain profitability and operational integrity, the business also makes sure that local legislation is strictly followed, that is why the company performs frequent audits and puts strong financial controls in place.

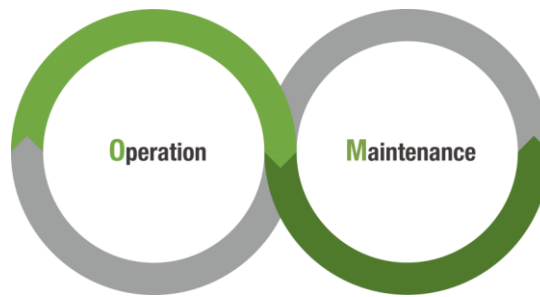
2.5 Operations Management and Information System Practices

2.5.1 Operation Management Practices

Operations management practices in SARBS Communications Ltd. can be classified in to two sectors, one is product sector and the other is service sector.

In product sector the operation management includes identifying the customer's product requirement and procurement team get involves in purchasing the product. Although, there are two division in procurement team, one looks after local procurement and another looks after the foreign procurement. Local procurement team do not have to face much hassle in terms of purchasing products from local market. Whereas, foreign procurement team's job is more complex. Firstly, foreign procurement team contact with foreign supplier and share customer's requirement, if the requirement matches then request for quotation. Secondly, negotiate with the supplier for competitive price and issue PO. Thirdly, do LC processing for the product purchase. Fourthly, the supplier initiates production process and shipment the goods after production. Commercial team works on customs clearance of the products and then products are transport to warehouse. Warehouse team receive the products, before

keeping the products in store room an initial checking is done by them. Finally, the product is kept to the store room or delivered to customer. Previously, the warehouse team manually give input to the excel file to keep record of the product which is currently converted to software base system to increase the efficiency of management process.



On the other hand, the service sector is maintained by project team and operations team. SARBS has its team all over Bangladesh and as per customer's requirement the team visits to the site and provide necessary services as per customer requirement. SARBS provide following supports to the customers,

1. New site rollout
2. Site collocation
3. Power system installation
4. System integration and configuration
5. Site maintenance
6. Portable generator support
7. Site preventive maintenance
8. Civil construction
9. Tower erection
10. Bill collection

All the above services are divided among three major teams to provide seamless support to the customer.

2.5.2 Information System Practices

SARBS Communications Ltd. has its own software development team, whom have developed several software to meet company's need. For example, there is cash recusation software, KPI indicating software, project management software, employee attendance app. These software are integrated under one central server and employees have access to the server through software, here they can give input and analyze the required data easily. Database of ever work progress can be easily maintained by the server. As a result, the management and HR team can easily evaluate employee's performance along with company's yearly progress.

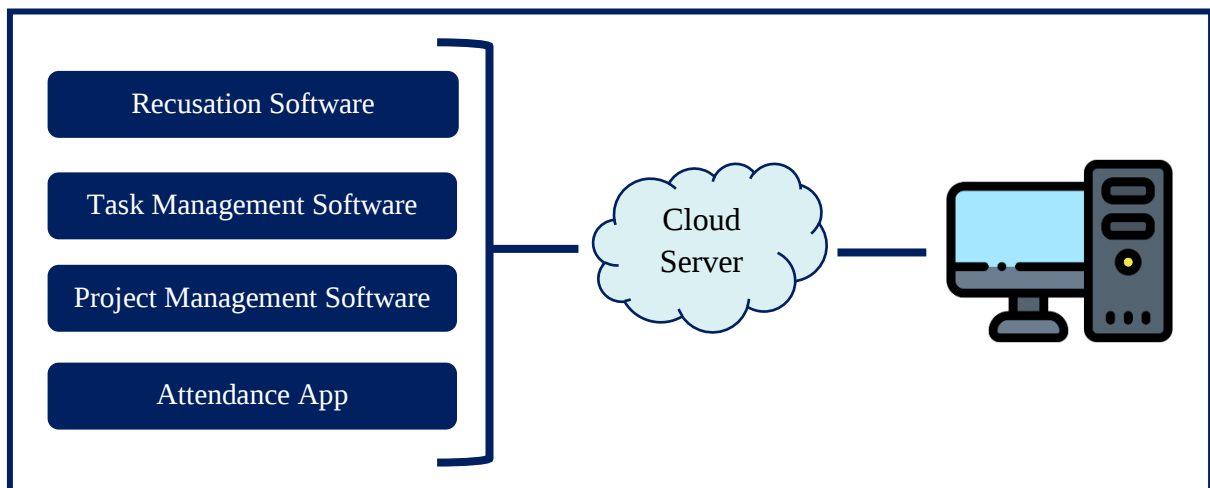


Figure 2. 6 Management Information System

2.6 Industry and Competitive Analysis

SARBS started its journey in 2011 and became pioneer in Bangladesh on 2017 for selling lithium-ion battery in telecom market. Till now SARBS hold 70% market share of lithium-ion battery supply and other company holds rest of the share. In terms of services SARBS has earned good reputation in the market.

2.6.1 SWOT Analysis

	• SARBS has strong market presence in telecom sector. • They have strong partnership with their overseas suppliers. • SARBS provides telecom turnkey solution in telecom market • SARBS provides strong focus on quality services and premium products to the customers.
	• SARBS only focuses in the telecom market, as a result the market is rigid. • High investment is required in this market, as the major products offered by SARBS and its competitor are imported from foreign countries. • As telecom market prefer bidding process, sometimes it is difficult to win projects
	• Telecom market will boom in future as 5G technology is coming in Bangladesh. • As Bangladesh is a densely populated country so it requires good number of towers which creates good opportunity for SARBS. • SARBS has in-house R&D team who can design and develop products considering the current telecom market trends.
	• Foreign currency fluctuation is a high threat for SARBS as major products are imported. • Government has strict policies over importing telecom products. • Technology is always upgrading in telecom, SARBS always has to be alert about it..

Figure 2. 7 SWOT Analysis

2.6.2 Porter's Five Forces Model



Figure 2. 8 Porter's Five Forces Model

Competitive Rivalry > Low: Intensity of competitive rivalry is low in the telecom market. There are few players in the market who provide telecom products and services in Bangladesh. Among those competitors SARBS hold strong position in the market because of its quality products and services. SARBS always ensure good after sales support to the customers which gives competitive advantage among the competitors.

Threat of Substitute Products or Services > Low: The products and services provide by SARBS has less threat because it is difficult to enter in this market and the major products supplied by SARBS requires import license. For example, lithium-ion battery is considered as dangerous goods and to import it company requires additional license to import dangerous goods from the government. Moreover, the products sold by SARBS are special kinds of product that is only used in the telecom market and that is why threat of substitute products are low in the market.

Threat of New Entrants > **Low:** There is low risk of new service providers entering Bangladesh's telecom sector. While, the telecom sector is capital-intensive, so new competitors would need to make large investments in technology and manpower to compete with long-standing firms like SARBS, even if there aren't many major obstacles to entrance. Another obstacle to entrance is the company's well-established clientele and solid brand recognition.

Bargaining Power of Suppliers > **High:** The bargaining power of suppliers is medium to high for SARBS Communications Ltd. There are good number of suppliers in China who sell telecom power equipment like lithium-ion battery, rectifier and telecom power cabinet. Among them very few manufactures the product whereas other supplier does OEM from the manufacturers by their own brand name and resell in market. As a result, only manufacturers can offer best price in the market. SARBS direct purchase from the manufacturer, as the number of product manufacture is less, supplier has more bargain power in the market.

Bargaining Power of Buyers > **Low:** The bargaining power of buyer is low for SARBS Communications Ltd. as there are less competitor in the market who can supply telecom power equipment as well as services to the customer. Because this sector requires different types of company certification for both import power equipment products and telecom services. As a result, buyer has limited option. Moreover, SARBS provides competitive price and better after sales support compare to other market players and so, they hold the maximum share in the market compare to others.

In summary, SARBS Communications Ltd. operates in a moderate competitive market in Bangladesh and SARBS's market reputation is better compare to other players in the market because of its uncompromised support to customers.

Chapter 3 Project Part

3.1 Introduction

3.1.1 Background

SARBS Communications Ltd. a telecom service provider company has grown its business throughout the years. Initially the major business of this company was only limited to providing installation services including telecom rollout projects, colocation projects etc. In recent years from 2017 the company started to supply DC Power System to the tower company and telecom operator. Whereas, the major DC power system like batteries, rectifiers, power cabinets are imported from different countries like China, India, Australia etc. SARBS Communications Ltd. sale these power system equipment at DDP model to the tower company and telecom operator. Although, SARBS Communications Ltd. purchase these products from the foreign supplier at CFR model.

Generally, tower company and telecom operator initiate tender, there different companies participate among them the participant with lowest price wins the tender. SARBS Communications Ltd. is one of the major participants among other competitors. They have won many tenders throughout the years. As a result, the company needs a strong supply chain line as they are purchasing products from foreign supplier. Moreover, every tender project has its deadline of supplying and installing the products. Supplier has to meet those deadlines strictly otherwise a heavy penalty is imposed on the supplier by the customer (tower company and telecom operator).

During my internship period in SARBS Communications Ltd. I have seen that the company sometime faces problem to meet the customer deadline of supplying goods that are imported from foreign country and it results in a good amount of penalty for the company. My reporting manager has given me a task to identify the root cause of this problem and find a way to improve procurement process.

3.1.2 Literature Review

All companies that are involved in production and OEM from foreign companies should have the appropriate sequence of processes associated with the efficient delivery of semi-finished, finished products and other raw materials that are required. Energy, materials, fuel, raw materials, and human resources, all must be integrated efficiently to prepare an improved process (Sikora, M., 2021).

According to Coyle et al. (2006) an organization's competitive advantage is influenced by the efficient supply of goods and services. The improved procurement process guarantees the necessary quality of products and ensure smooth supply chain process. Among other benefits, a strong partnership between the supplier and the receiver can shorten order fulfilment times, save costs for both parties, improve delivery certainty, and enhance quality (Tyc-Sznil, 2007).

Ensuring an efficient flow of information between all parties involved in procurement process is the foundation of an effective supply chain management in an era where the external environment is changing rapidly. Companies should form partnerships with other organizations and build networks of connections that enable the accomplishment of the projected objectives in order to operate effectively in a changing environment. (Sikora and Bielski, 2017).

Sikora, M., 2021, had conducted five case studies where the author found on time ordering of materials, better delivery timing, enhanced supplier communication, fewer deliveries of damaged or defective goods, understanding and proper use of the software integrated procurement process and long-term planning are the key factors impacting the company's efficient supply chain process. Using all the process efficiently a plastic processing company has improved their raw material procuring process and increased

their production volume up to 20%, also maintained product quality. Moreover, another organization that produce frozen meat products does not use software-based supply chain management processes like SAP. The organization's procurement and production planning process are therefore inefficient. All departments' processes improved after the SAP IT department was put into place, particularly in the acquisition of raw materials, which was about 24% more efficient than the old process.

According to Liu, T. and Wu, H., (2023) optimal procure management process needs to be more effective than improving communication between the company and its suppliers. In terms of supplier relationship there is no doubt SARBS Communications Ltd. is always at top but the procurement management process of the company is not so smooth. Optimal supply chain with improved procurement process will play a key role to achieve competitive advantage as it gives a company to provide best experience to its customer in terms of B2B business (Chardine-Baumann, E. & Botta-Genoulaz, V. 2014). Moreover, it reduces the chance of acquiring penalty from the customer. In terms of gaining sustainable and efficient supply chain management system understanding the optimization of supply chain process is important (Kaur, Singh, Garza-Reyes, & Mishra, 2018).

Information technologies creates positive impact on restructuring supply chain system of a company where tracking product and meeting deadline is an important factor. It also enhances efficiency of monitoring the supply chain process of a company (Hasan Kürşat GÜLEŞ, 2012). Moreover, incorporating information technology in supply chain management helps tracking and visualizing the overall process. As a result, the bottleneck of the supply chain management system can be identified easily and companies can take proper measures to improve the process (Jaana Auramo, Jouni Kauremaa).

3.2 Problem Statement

SARBS Communications Ltd. has become one of the best supplier and installation partner to their customer because of their commitment to the customers. Moreover, the product line of the company has also been increased throughout the years. SARBS Communications Ltd, has total two large warehouses near Dhaka city. In one warehouse foreign products are stored and the local products are stored in another one. In recent times SARBS Communications Ltd. is importing large number of products on regular basis. As a result, it is getting difficult for the management to keep track of the incoming products and outgoing products.

Current Procurement Process:

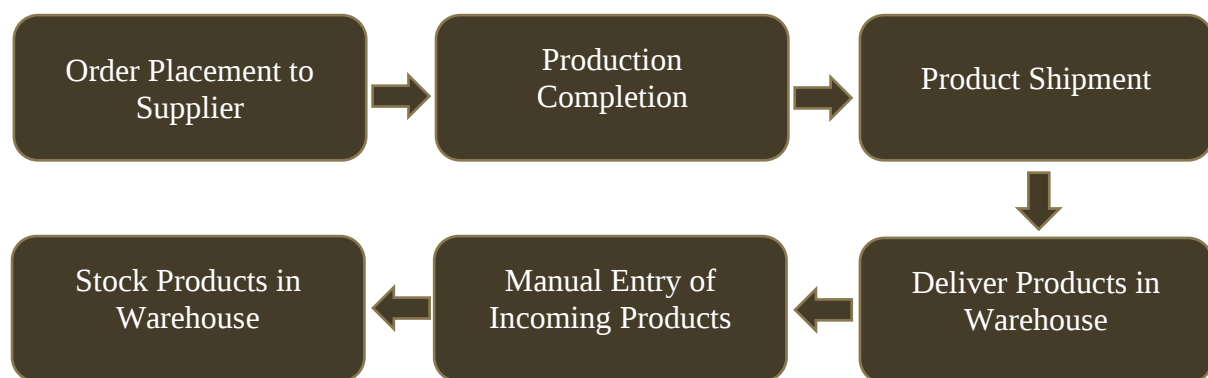


Figure 3. 1 Current Procurement Process of SARBS

For the current procurement process shown in figure 3.1 SARBS is facing below problems,

- **Inefficiency in Product Tracking:** It is difficult to track the product status as only the procurement team knows about the status. So sometimes it gets difficult for project team to share products supply information to customer without communicating with procurement team.
- **Time Consuming Process:** For the warehouse keeper, sharing reports manually on a regular basis is a major hassle because it takes a lot of time.

- **Static Inventory Tracking:** Project team cannot track real time inventory status as the inventory record is kept manually in spreadsheet. As a result, it gets difficult for them to plan project depending on the inventory status due to static inventory tracking.
- **Increase Risk of Theft Incident:** Using of spreadsheets to record product incoming and outgoing data manually increases the risk of theft incidents.
- **Data Manipulation:** Warehouse keepers have complete authority over the spreadsheets, allowing for potential data manipulation.

According to our managing director, the current procurement process is getting more inefficient due to lack in communication between internal teams. Also, the whole process is very much time consuming. As a result, we are failing to deliver the products to our customer within the given timeline. Moreover, he has assigned the supply chain manager and project manager to mitigate this problem with a solid plan to improve our procurement process.

On the other hand, head of supply chain management has stated that as our product portfolio has increased significantly within 2 years, we have to adopt software base system so that procurement process can be improved as well as we can track our products efficiently.

Furthermore, the project manager has informed, that recently they have found a report where 30 meters cable had been lost and it was not possible to track from which point the cable was lost due to inefficiency in product tracking process.

To overcome this situation, I came up with this solution with the help of my manager to develop a supply chain management software that can mitigate product sourcing issue, inventory management issue, theft incident, warehouse management issue etc. Moreover, the software will also help project team to share forecast of the products that is required in the upcoming projects based on the existing inventory shortage. This process will mitigate the supply shortage of foreign products.

3.3 Objectives

Considering the above stated problem, I have discussed with my line manager and defined my objectives for developing a software-based supply chain management system, in which my main goal is to improve procurement process, track product status, reduce theft and data manipulation incident. The main objective of my report is given below,

- **Software Development to Improve Procurement Process:** Develop a software with the help of in-house software team to optimize the supply chain management process to mitigate the challenges faced by our procurement team. The software will be used by the project team to input required product name and quantity. Warehouse team will input the data of current stock and the software will show the deficit quantity of the product. After that the procurement team will purchase the additional quantity required for the project and update the product status on regular basis. So that everyone will align with product status and plan accordingly.
- **Minimize the Risk of Foreign Product Supply Shortage:** This whole idea is generated due to the supply shortage of foreign products. As our company's major products are imported from foreign country and the lead time is higher. As a result, if the procurement team can identify the requirement of the products at early stage, then supply shortage risk can be minimized.
- **Cloud-based Systems:** Update current spreadsheet method to cloud-based system that is more secure and easily accessible for the responsible person. In spreadsheet it is very time consuming to input data and make summary of the inventory stock, required product quantity and product status. Multiple spreadsheets will not be required here, one platform will be used for multiple departments.

- **Real-Time Inventory Tracking:** The inventory can be easily tracked by the procurement team and project team to plan accordingly. Warehouse team will input the “incoming” and “outgoing” product information by using barcode scanning technology in the software by which the real time product status can be visible.
- **Access Control and Audit Trail:** In the software the data access and editing rights will be restricted based on employee’s role in the company. For example, project team cannot input data of “incoming” and “outgoing” product. They can only give their product requirement based on allocated projects. Whereas, warehouse team cannot edit the required quantity of projects, they can only give input of the products that is in the inventory. This will help reducing data manipulation of the stock record. Moreover, internal audit team can track record of all activities, such as which user has input which data. It will help reducing the risk of theft and data manipulation.
- **Automated Reporting System:** The software will be capable of generating report in excel format. The report can be customizable according to the parameters required by the user. It will help the user to prepare an overall summary as per his need. Furthermore, it will help the user to prepare a report manually which is very much time consuming at recent time.

Targeting the above objectives, I have started my work with the in-house software team and started developing the software. Initially I have outlined my objectives and share in details with the management. After getting approval from them, along with my line manager I have discussed about the software requirement with our in-house software team.

3.4 Significance of My Responsibilities

Responsibilities that I have performed in my internship period has improved the overall supply chain process, specially it has helped tracking the products record. Management is able to direct keep record of the warehouse. Moreover, they have full control on the warehouse management by the help of this software. Furthermore, there are many scopes to optimize the supply chain management and identifying the bottleneck. Not only warehouse management is optimized by this software but also it shows an overall status of importing products from foreign country as well as manufacturing status of the local products.

For working more than four years in this company I have faced several problems during the time of sourcing products from foreign market and local market. As a result, by the help of my reporting manager I came up with this idea to develop a supply chain management software that can mitigate all the challenges that is faced by the company. Moreover, the MBA program of Brac University also helped me a lot to develop this software that can optimize the risk of supply chain management procurement process, product tracking process, report generation process etc. My core responsibilities in this project are given below,

- 1. Requirement Gathering and Documentation:** Defining the key objectives and functionalities the software will have such as procurement, product tracking, inventory management, and product deficit calculations. Collaborate with the software users to gather requirements and align expectations. Documenting the work flow, user cases and identify the pain points in the current manual system that needs to be developed.
- 2. Process Mapping:** Firstly, provide detailed description of current supply chain processes including procurement cycle, inventory management, product requirement for project planning with software team. Also, share the current

improvement that is required in the software. Secondly helping the software team to create process flows for automating the overall process.

3. **Feature Prioritization:** Collaborating with the user team I have identify the critical features to prioritize software development and decide a timeline for each feature of the software.
4. **Data Management:** Ensure that the current stock is properly listed in the software. Cross check the procurement record, inventory record, aligning with procurement team and warehouse team.
5. **User Experience (UX) Insights:** Share insight with users about the roles and their interaction with the software, such as procurement officer, warehouse keeper and project managers. Test and provide feedback on prototypes to ensure the system is user-friendly.
6. **Software Testing and Validation:** Actively participating in software testing to ensure the system meets requirements and functions correctly for supply chain operations.
7. **User Training:** With help of my line manager and software team I have conduct a training session with the user team to educate them about the software. For example, purpose of the software, how to operate the software, how data can be input in the software, who can get access of the software data et.
8. **Post-Implementation Support:** Furthermore, I have monitored the progress on regular basis regarding the performance of the software before launching the software. Communicate with end user for feedback to ensure smooth integration of the software.

3.5 Methodology

To develop the software for supply chain management process I have followed the following steps which is shown in figure 3.2,

1. Problem Identification

- Identifying the problem in procurement process, product tracking system, project management. Including inefficiencies in procurement.
- Conduct interviews and gather feedback from warehouse keepers, procurement officers, and project managers.

2. Requirement Analysis

- To analyze the requirement several meetings were held with the user to define the software's essential features, such as product tracking, inventory status updates, deficit calculations, and improving procurement processes.
- I have prepared the documents of workflows, desired functionalities and analyze them to design the software with a user-friendly interface.

3. Process Mapping

- Prepared a map of existing supply chain processes and identify areas where the improvement is necessary.
- Developed flowcharts and diagrams to visualize the current and proposed processes.

4. Collaboration with the Software Team

- Shared the workflows and requirements with the software development team and provide them details about the project.
- I have also supported the software team in designing system features like real-time tracking, deficit calculation and reporting dashboards.

5. Development and Testing Participation

- Provide feedback to the software team on prototypes and assist them to design user interface (UI) that meets supply chain needs.
- Several challenges were faced by the software team while developing the software. I have frequently participated in software testing to make the software more user-friendly.

6. User Training

- Parallely, I have assisted in creating training materials and conducting sessions for end-users, so that the user can easily cope up with the software. Moreover, it helped me to understand the challenges user might face in future, which I had shared with software team to make the software intuitive.
- Ensure smooth adoption of the software by resolving user concerns and collecting feedback from them.

7. Software Trial

- Launched the software on trial basis for 2 months and collected feedback from the user team every week. After evaluating their feedback important point were modified in the software.
- Helped the user team on regular basis if they faced any challenges operating the software.

8. Prepare Comparison Statement

- Prepared a comparison statement between manual process and software-based process. Share the report with management and collect feedback from them.
- While preparing the comparison statement positive outcomes were visible in the software-based system. Project dead line were met, products were tracked

easily, procurement process were improved as the procurement team can easily identify the future forecast of the required products.

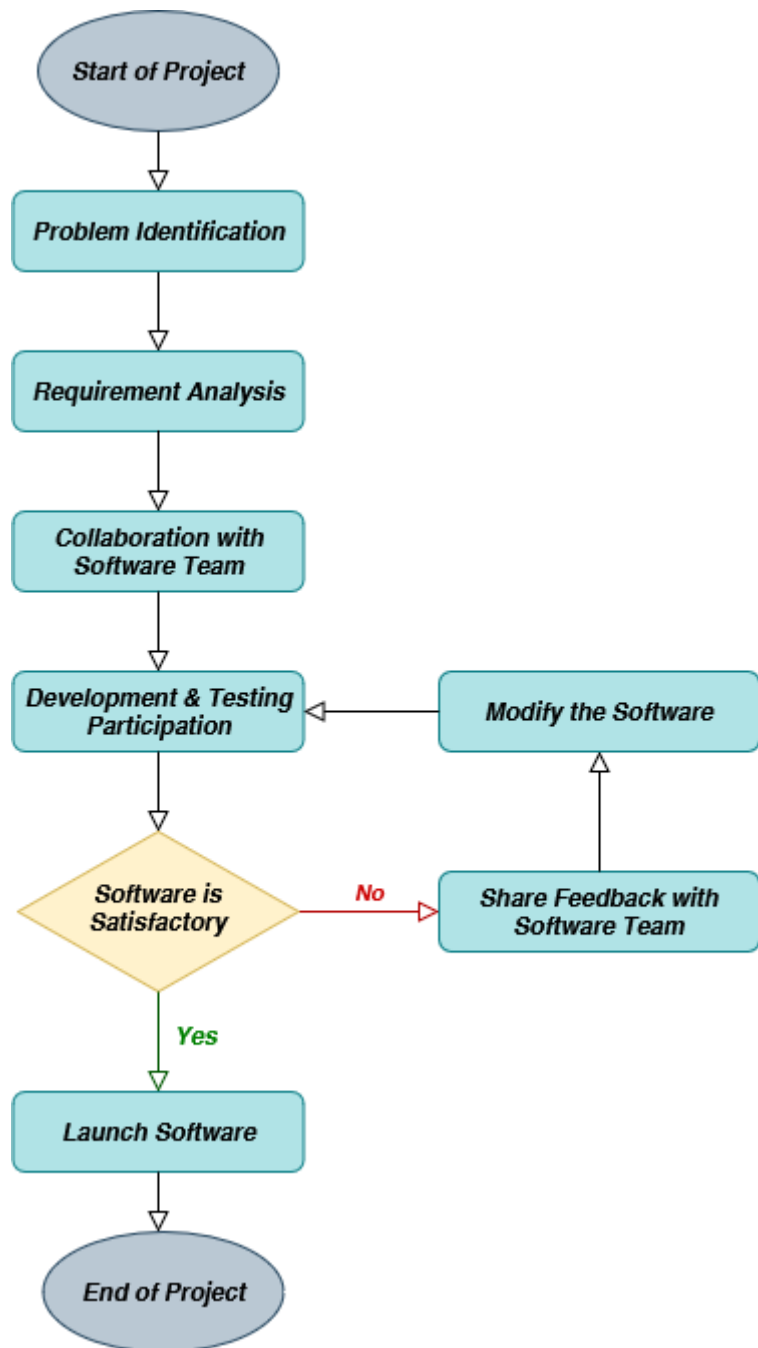


Figure 3. 2 Working Process Flow Chart

3.6 Proposed Solution

Due to foreign procurement problems and inventory management issues SARBS Communications Ltd. has encountered fall down in business. To overcome this problem, I came up with a process. At first, the stock product will be monitored by the warehouse team and give input of the stock quantity in the software. Secondly, procurement team will collect information from the supplier about production lead time and delivery lead time of the product and give input in the software. Thirdly, by analyzing the product requirement and stock quantity, procurement team will initiate purchasing process that includes taking quotation, negotiation, initiation PI, giving PO, initiating LC payment process for the products. Fourthly, procurement team will keep track of the product status and update it in the software on regular basis, so that everyone will be acknowledged about the product current status through software and project team can plan their project accordingly.

3.6.1 Software Development:

To develop the software, our software team used PHP language and Laravel framework to design the software. There are other languages like Golang, Node.js, TypeScript, Ruby, Java, .Net etc., among this software our team have chosen PHP to develop the software. Other languages have few challenges like,

- Require more resources, whereas for PHP maximum 2 resource is enough to design the software.
- More resource will increase the project cost.
- Other languages require more time to develop a software, whereas PHP requires less time.

- PHP provides strong community support and vast number of frameworks, whereas other software has limitation.
- Few of the software are a bit complex to develop a software whereas PHP is renowned for its simplicity and so the modification can be done easily in the software.

Considering the above challenges software team have chosen PHP language to develop the software and for PHP language. PHP has a wide range of framework which simplify and speed up software development. Moreover, these frameworks provide prebuilt-modules, libraries, and tools that can handle common tasks like routing, authentication, database interaction etc. Some most popular PHP framework are, Laravel, Symfony, Laminas, Phalcon, CakePHP, etc. Analyzing these PHP frameworks our software team have decided to initiate the project with Laravel framework for the following reasons,

- Laravel is more developer friendly, it has large ecosystem and strong community.
- It has built-in authentication and authorization facility.
- It has blade templating engine which can support building dynamic view for dashboard of the software
- This framework can be used in large-scale application and modern software development.
- This framework is less time-consuming.

Considering the above features Laravel framework is chosen by the software team to develop the software. Team has worked relentlessly to develop the first prototype

within 2 weeks, after that we conducted several meeting sessions with user teams and finished developing the final version of the software within a week.

Here are some pictures (figure 3.3 and figure 3.4) of the supply chain software for reference,

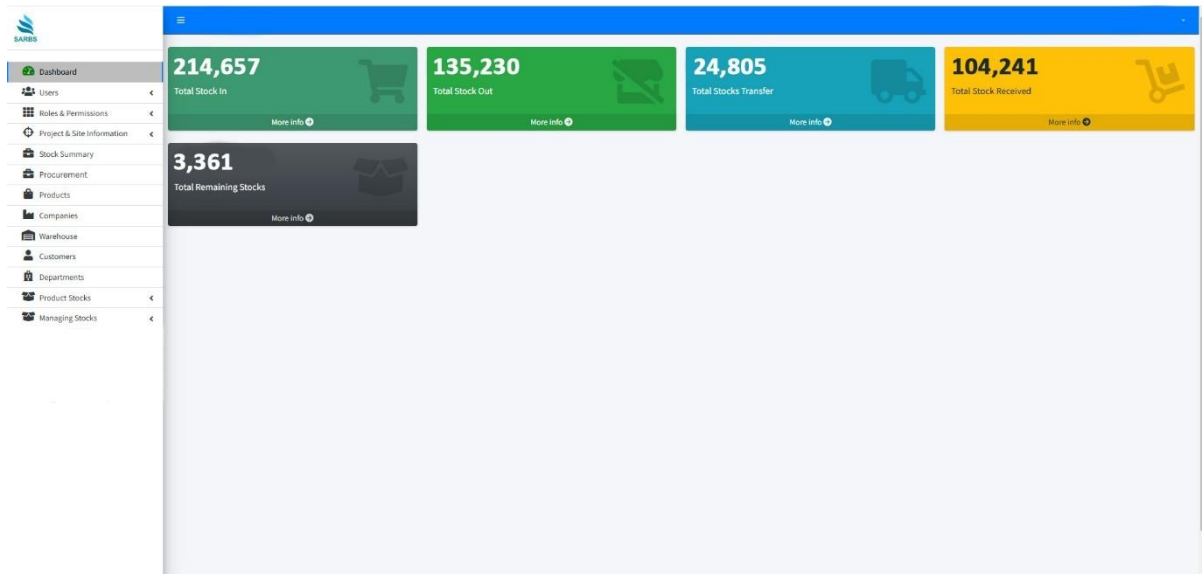


Figure 3. 3 Software Dashboard

No	Category	Product Name	Product Code	Unit	Description	Stock Qty	AddedBy	Action
1	Battery	battery(48_180Ah)	2310	PC'S		0	Sribash Sarkar	
2	Battery	battery(48V_180Ah)	2311	PC'S		4	Sribash Sarkar	
3	Battery	battery(48V_280Ah)	2312	PC'S		1	Sribash Sarkar	
4	Battery	2V_100Ah	2574	PC'S		0	Biplab Baidya	
5	Battery	48v_100Ah	2575	PC'S		18	Sribash Sarkar	
6	Battery	2V_400Ah	2066	PC'S		192	Biplab Baidya	
7	Battery	2V_400Ah	2067	PC'S		0	Biplab Baidya	
8	Battery	2V_400Ah	2068	PC'S		96	Biplab Baidya	
9	Battery	AGM-2V-300/400/420/500/600Ah	27	pcs	2V-300/400/420/500/600Ah Site returns battery	0		
10	Battery	L-30-48V-100Ah	28		48V-100Ah	0		
11	Battery	(li-ion)-48V-100Ah	29		48V-100Ah	319		
12	Battery	48V-250Ah	2593	PC'S		2	Biplab Baidya	
13	Battery	48V-100Ah	38		48V-100Ah	193	Admin	
14	Battery	48V-185Ah	39		48V-185Ah	48	Admin	
15	Battery	48V-100Ah	40		48V-100Ah	609	Admin	

Figure 3. 4 Inventory Tab in Software

3.6.2 Software Input Method:

- **Project Team:** Firstly, project team will analyze customer's product requirement with delivery deadline then input the data in the software. Software will calculate the deficit quantity of the product. If the products are available in the stock, then procurement will not be notified. Whereas, if the stock is not sufficient then the procurement team will be notified immediately.

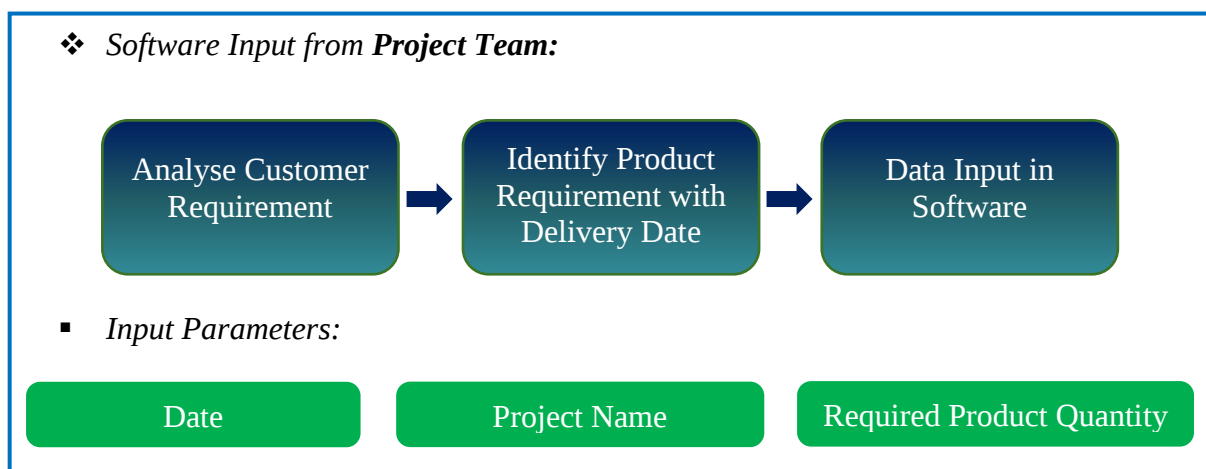


Figure 3. 5 Software Input Parameter from Project Team

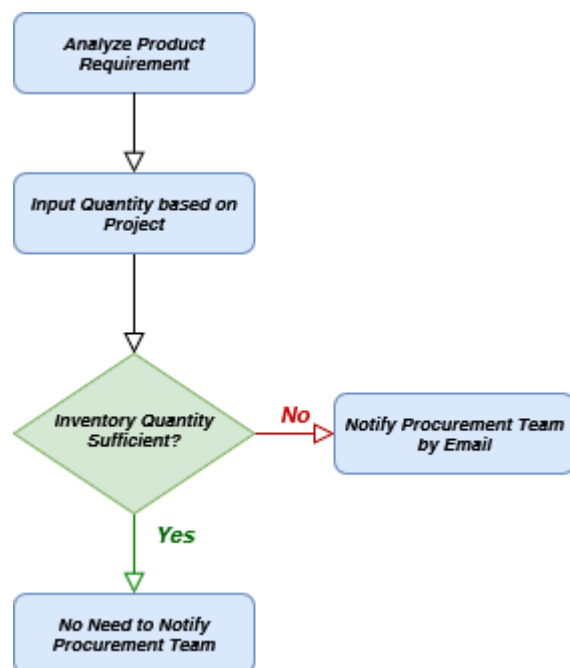


Figure 3. 6 Software Working Process (Project Team)

- **Procurement Team:** After getting notification of insufficient product by email procurement officer will start preparing for purchasing the product including taking quotation, negotiation, initiation of PI, giving PO, initiating LC payment process for the products and update current status accordingly. Procurement team's responsibilities includes sourcing to safely deliver the products in the warehouse.

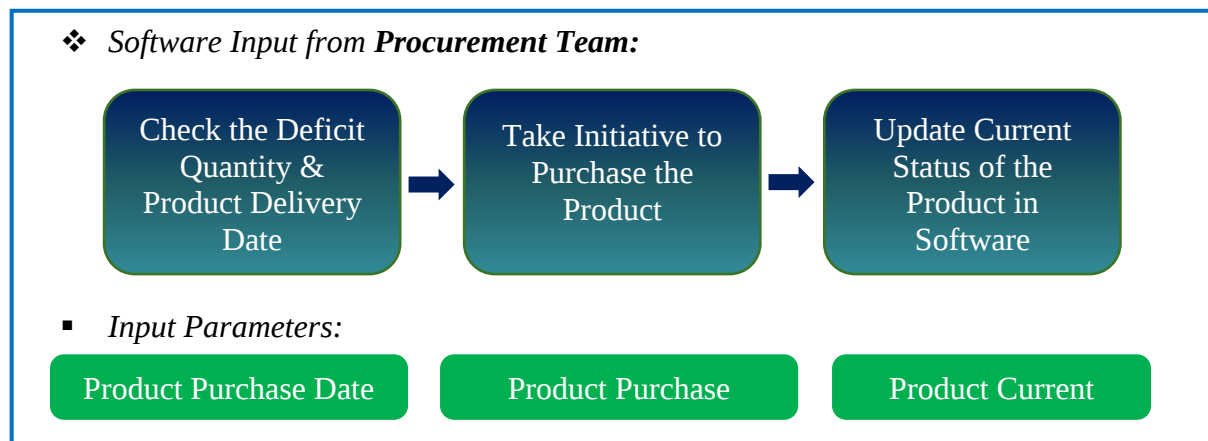


Figure 3. 7 Software Input Parameter from Procurement Team

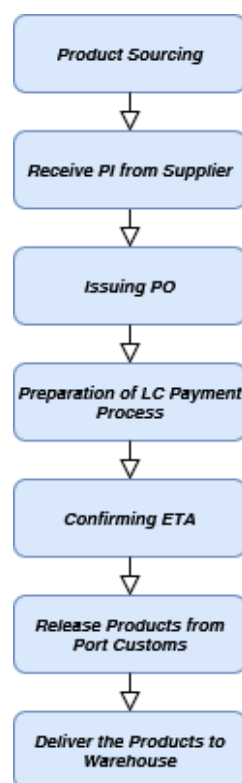


Figure 3. 8 Software Working Process (Procurement Team)

- **Warehouse Team:** After receiving the product in warehouse the warehouse team will give product ID, different category products have different product ID. Under those product ID warehouse team will scan barcode of products and it will automatically add to the inventory.

❖ *Software Input from Warehouse Team:*



▪ *Input Parameters:*



Figure 3. 9 Software Input Parameter from Warehouse Team

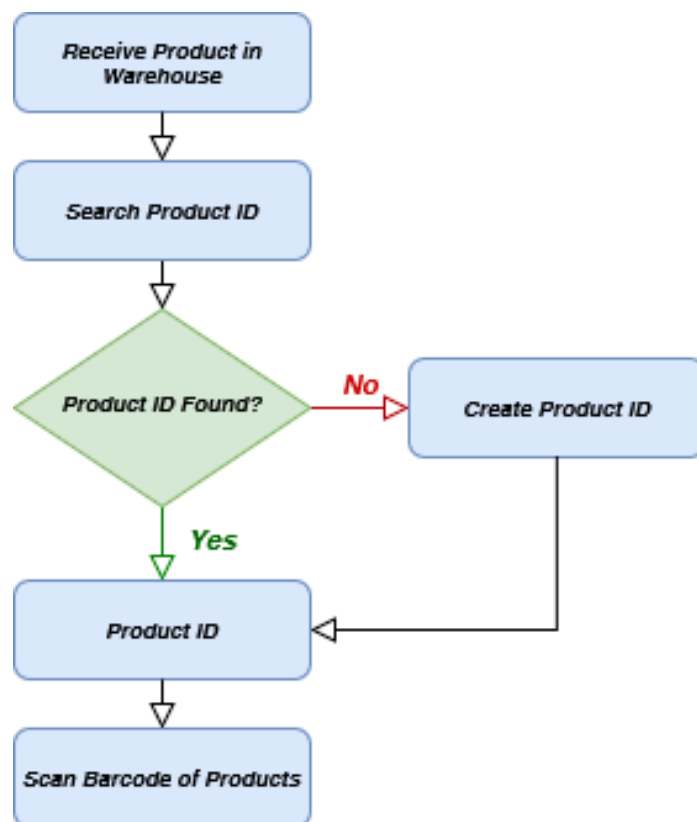


Figure 3. 10 Software Working Process (Warehouse Team)

- **Audit Team:** Audit team will check the order quantity and receive quantity to identify the mismatch of the purchased product.

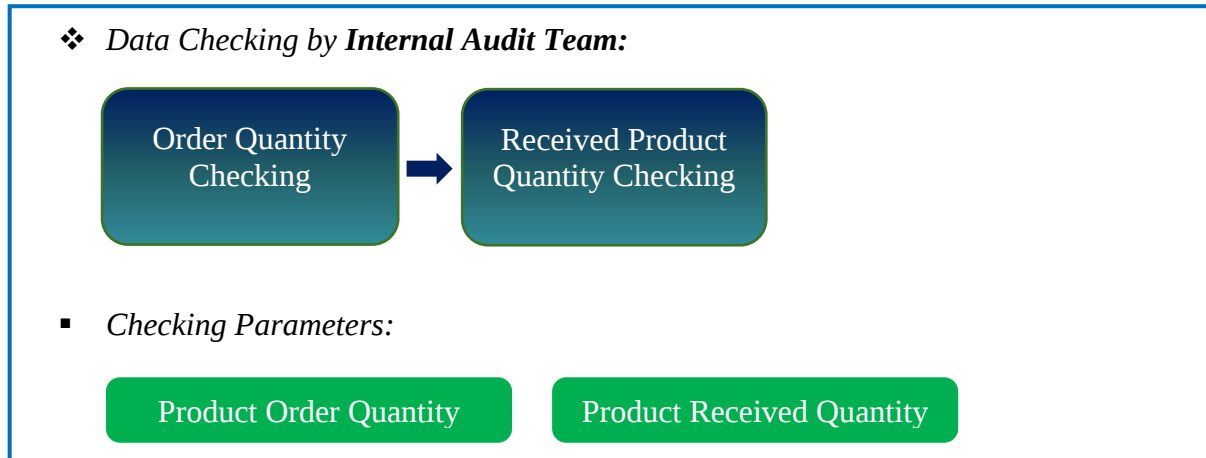


Figure 3. 11 Software Checking Parameter by Audit Team

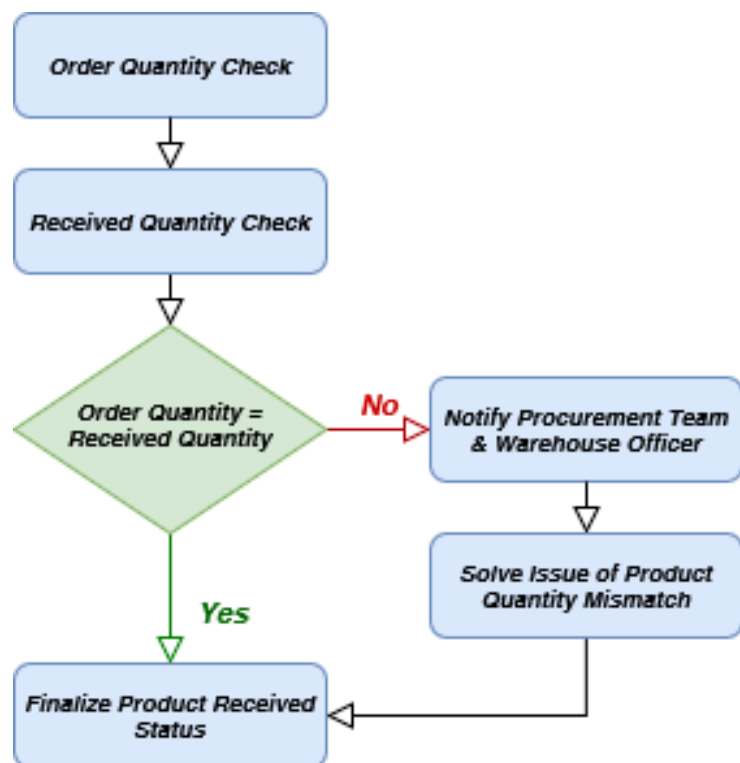


Figure 3. 12 Software Checking Process (Audit Team)

After giving all the input in software everyone can track the product status easily. It will improve the procurement process, product status as well as supply chain process.

3.7 Findings & Analysis

Introducing this software to the project team, warehouse team and procurement team had brought a positive impact in the supply chain process. The software is currently in trial phase. We have trained all the team about, how they can operate the software. After, evaluating trial period of 2 month we have found significant outcome. Few advantages of using the software-based procurement process are given below,

- **Process Efficiency:** Software-based procurement process is more efficient than manual excel based procurement process. The software helps to identify the current stock, future requirement, product status in the dashboard whereas for excel based procurement process we need to check every data manually. According to figure 3.13 implementing the software-based system efficiency in procurement process increased by **25%**, product tracking efficiency increased by **35%**, project planning and execution efficiency increased by **20%**, report generation efficiency increased by **40%** and product data entry efficiency increased by **60%**. Moreover, this software-based procurement system has reduced the theft incident to zero.

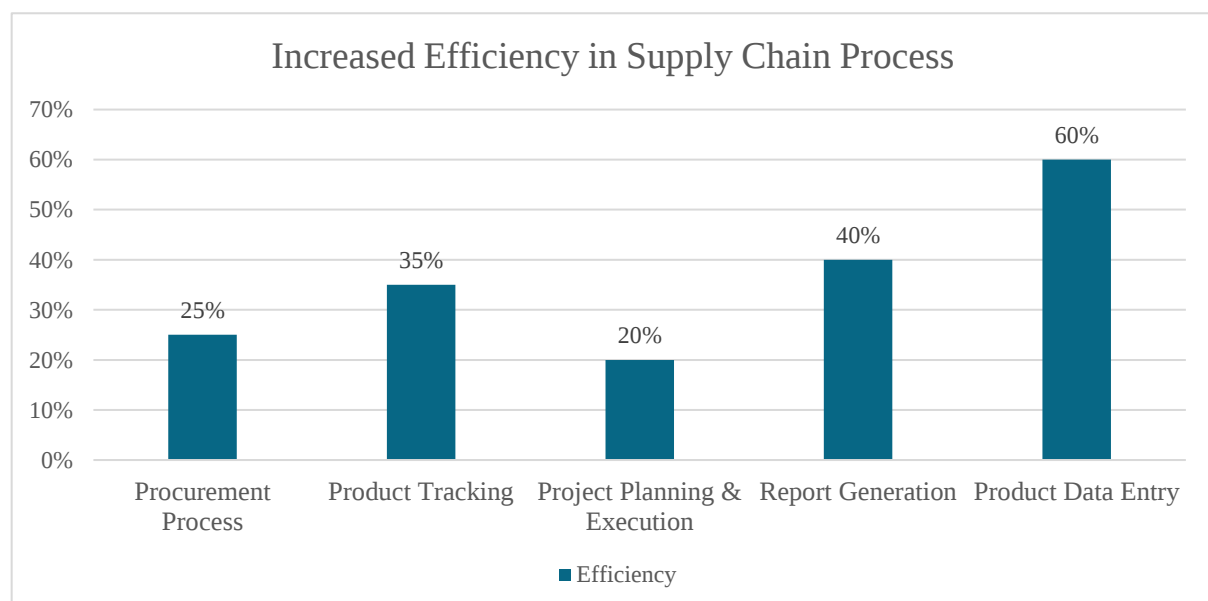


Figure 3. 13 Increased Efficiency in Supply Chain Process

- **Data Accuracy:** Data are more accurate and reliable in the software rather than manual calculation. According to our Internal Audit Officer the inventory count is accurate. He has physically checked and justify it. Moreover, he also stated that theft incident has reduced to zero after adopting the software in warehouse.
- **Scalability:** Software is effective for large scale data whereas for manual data entry process it is difficult to manage large scale data. In figure 3.13 we can see that the software system has increased the efficiency of product data record around **60%**. Previously it was very difficult for the warehouse team to enter every single data manually in excel which was very much time consuming.
- **Report Generation:** Software based procurement process allows real-time customizable report. On the other hand, reports were prepared and updated on regular basis manually which is time consuming. After showing the report generation process to our Managing Director and Chief Operating Officer they were very much pleased. Managing Director has stated that, now management body can easily track the bottleneck through the software and resolve it.
- **Approval Process:** Procurement approval process is more reliable and effective in software-based system, it gives notification to the user while any approval is requested also allow them to give approve instantly. Whereas, manual process requires email approval and time consuming.
- **Accessibility:** Data is accessible from anywhere via cloud-based system but for manual system data is accessible where excel files are stored.
- **Auditability:** Software based procurement process provides transparent data log which helps to monitor the stock strictly whereas manual system has limited visibility and data manipulation chances are high. As a result, manual system requires more effort to maintain record properly, from figure 3.13 we can see that

efficiency in product tracking has increased **35%**. As a result, work has become easier for Audit Officer to track product in terms of “incoming” and “outgoing”, he can easily identify the mismatch of the product and take action immediately to resolve the issue.

- **Procurement Cycle Time:** Procurement cycle time is shorter, automated process reduces delay and help to identify the bottleneck of the process easily. On the other hand, manual process is time consuming due to manual checks and approval. In figure 3.14 previous purchasing process is shown, here we can see the procurement cycle is bigger and requires more time compare to current procurement cycle shown in figure 3.15.

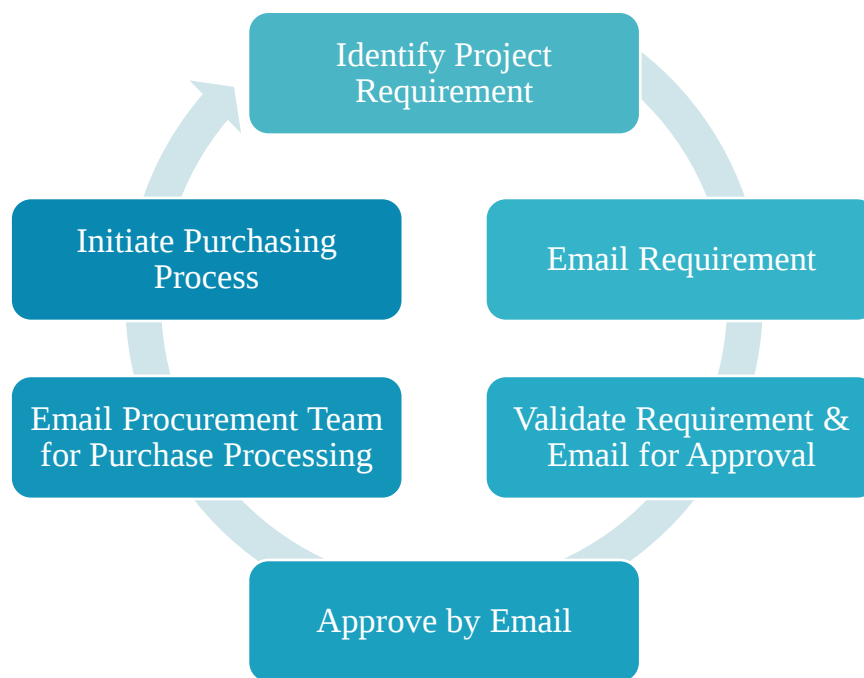


Figure 3. 14 Previous Procurement Cycle Time (Manual)



Figure 3. 15 Recent Procurement Cycle Time (Software)

Adopting the software in procurement process has also played an important role in terms of customer satisfaction and reducing penalty. I have analyzed the data from January 2024 to April 2024, here January and February month data is without procurement software and March and April data is with software-based procurement system. A graphical representation of the difference is given below,

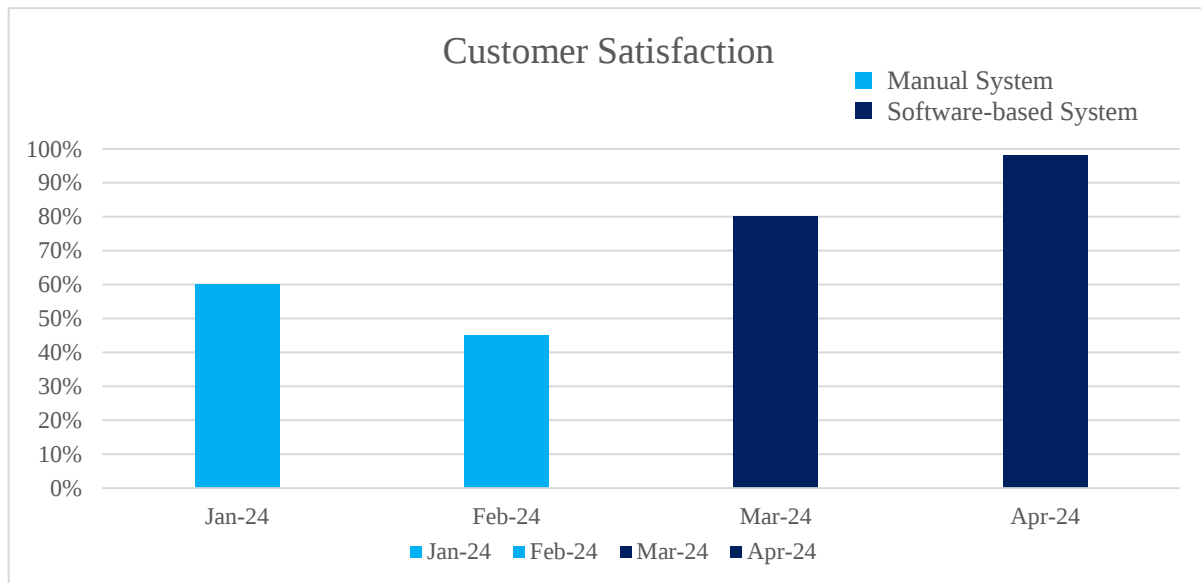


Figure 3. 16 Customer Satisfaction Data (Manual System vs Software-based System)

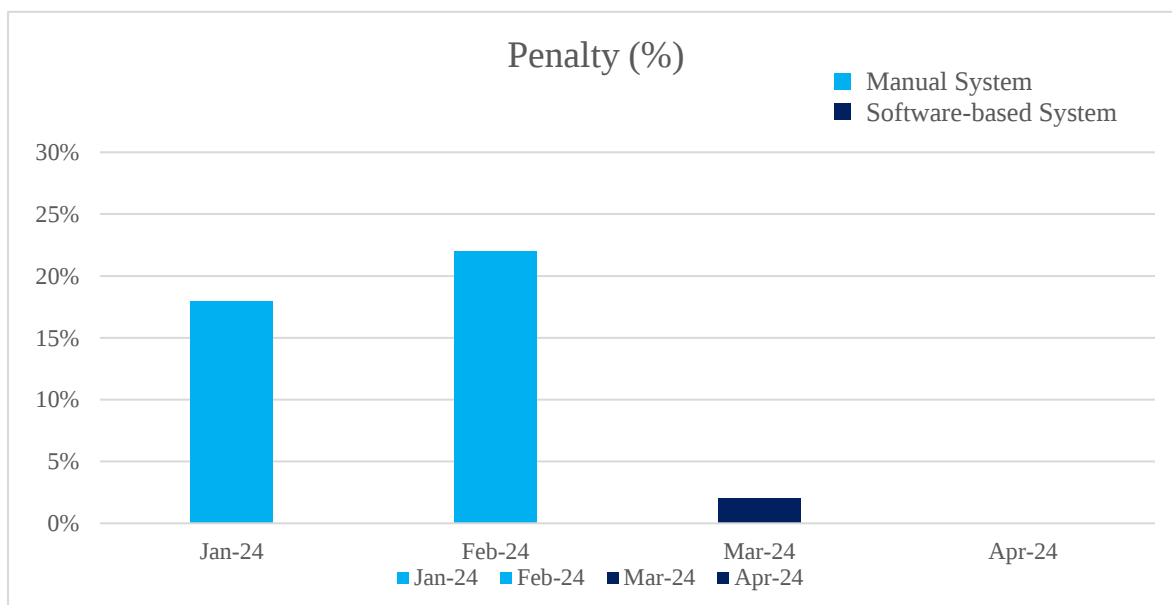


Figure 3. 17 Penalty Reduction Data (Manual System vs Software-based System)

Analyzing the above graphical data, we can see in figure 3.16 that in January 2024 and February 2024 customer was not satisfied due to delaying the product supply as a result, the customer has imposed 18% and 20% penalty (figure 3.17) according to the contract. The company has started adopting the software-based system as trial basis from March 2024 and according to the above data we can see significant change in customer satisfaction and penalty reduction.

Though in March the company has to incur penalty around 2% (figure 3.17) due to new adoption of the software but in April it was reduced to 0% (figure 3.17) as well as customer was satisfied with the performance of our product supply strategy.

3.8 Conclusion

With an excellent market presence SARBS Communications Ltd. has effectively established itself as a dependable supplier of power solutions in Bangladesh telecom market. The company's forward-thinking strategy and capacity to adopt new technology has allowed SARBS to develop a software-based procurement process. After adopting the software in procurement system, Supply Chain Management department has found positive impact in KPI. We have trained project team, procurement team and warehouse team regarding software usage. Almost all the team members have adopted the software and using it on regular basis. As a result, the problem that we are facing earlier was solved by the software.

Previously it was difficult for the procurement team to identify the product requirement due to communication gap between internal team. After introducing the software, the procurement process has been improved in a significant way. Project team now plan project easily, procurement team can process product purchase more efficiently and audit team can easily track anomalies in warehouse. These improvements will mitigate the losses that company was facing for few months.

Furthermore, it was a pleasant experience for me to be a part of such project in SARBS Communications Ltd. where I had the opportunity to work closely with software team, project team and audit team.

3.9 Recommendations

Throughout the years SARBS Communications Ltd. has expand its business in telecom sector. Initially SARBS Communications Ltd. has started its business by only providing services in telecom sector. Slowly they have moved to product delivery and installation, from 2022 SARBS has started to provide turnkey solution to telecom operator and tower companies. Customer will only provide the GPS location and SARBS will take care of all the necessary work which includes SAQ, Soil Test & Design, Civil Construction, Commercial Power Connection, Telecom Tower Supply & Erection, Product Delivery & Installation, Site Performance Acceptance Test.

SARBS has expand its business the product line has also increased as a result, it is very difficult for SARBS to understand product requirement, track products in warehouse and control theft incident. After introducing the supply chain software, problems like project planning according to available products, warehouse tracking, procurement process have become much easier. Theft incident has reduced in a significant way, previously warehouse keeper keeps log of the products manually in excel which is now shifted to software. As a result, data manipulation is now very difficult for the warehouse keepers. Audit officer can track the product as well as product quantity.

Moreover, procurement team can easily identify the required product and process purchase accordingly by calculating the deficit products. After evaluating the software on trial basis for two months we found positive impact in procurement process, product tracking, increase in

process efficiency. Which not only reduced the penalty but also earned customer satisfaction towards the company.

Our in-house software team has worked very hard to develop the software and this is the fifth software that our software team has developed. Other software the company has are cash recusation software, KPI indicating software, project management software. The management has decided to accumulate all the software in one by which the operating cost ca be reduced. Our software team has taken the challenge and currently working on it. If the company can successfully develop the software, then the software can be operated like other ERP software that are renowned in the market.

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