Thesis Report

on

“Supplier Selection Criteria in Sustainable Supply Chain Management: A Case Study on NIPRO JMI Company Ltd.”

Submitted by:

Mohammad Al-Amin

ID: EMBA2401031001

Program: Executive Master of Business Administration (EMBA)

Major: Supply Chain Management

Department of Business Administration

Sonargaon University (SU)

Submitted to:

Department of Business Administration

Faculty of Business

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Submitted for the partial fulfillment of the degree of

Executive Master of Business Administration

Sonargaon University (SU)

Date of Submission: April 28, 2025

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Letter of Transmittal

April 28, 2025

Ummah Tafsirun
Lecturer
Department of Business Administration
Sonargaon University (SU)

Subject: Submission of thesis Report on "Supplier Selection Criteria in Sustainable Supply Chain Management: A Case Study on "NIPRO JMI Company Ltd."

Dear Madam,

With most respectfully to state that I am pleased to submit my thesis report titled **"Supplier Selection Criteria in Sustainable Supply Chain Management: A Case Study on "NIPRO JMI Company Ltd."** This report is an essential part of my EMBA degree requirements, and I had the privilege of completing my Thesis at **"Supplier Selection Criteria in Sustainable Supply Chain Management: A Case Study on "NIPRO JMI Company Ltd."**

This research was conducted under your valuable guidance and includes insights from relevant literature, data gathered through company records, and analyses of the industry specific challenged faced in Supplier selection criteria. I hope this report meets your Expectations and contributes meaningfully to the field of supply chain management.

I would really be grateful if you share your precious thoughts regarding the report. Also, if you wish to have further clarification about any aspect of my report, I would gladly answer your queries with further explanation, Thank you again for your support and patience.

Yours Sincerely,

Mohammad Al-Amin
ID: EMBA2401031001
Program: Executive Master of Business Administration (EMBA)
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Declaration of Student

This is **Mohammad Al-Amin**, a student of Business Administration, ID: EMBA2401031001 from Sonargaon University (SU) would like to solemnly declaration here that this Report on **"Supplier Selection Criteria in Sustainable Supply Chain Management: A Case Study on "NIPRO JMI Company Ltd."** has been authentically prepared by me under supervisor of **Ummah Tafsirun**, Lecturer, Department of Business Administration, Sonargaon University.

I didn't breach any copyright act internationally. I am further declaring that I did not submit this report anywhere for awarding any degree, diploma, or certificate.

Sincerely Yours,

_____

Mohammad Al-Amin
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Letter of Authorization

I hereby confirm that the project **"Supplier Selection Criteria in Sustainable Supply Chain Management: A Case Study on "NIPRO JMI Company Ltd."** is a genuine effort by **Mohammad Al-Amin** The research was conducted under my guidance. I also affirm that, to the best of my knowledge, the content presented in this report has not been included in any other project report or dissertation that led to the award of a degree to any candidate earlier, weather in the same context or a different one.

_____

Ummah Tafsirun
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Acknowledgement

I would like to express my heartfelt gratitude to all those who have supported throughout the journey of this thesis on “Supplier Selection Criteria in in the medical device manufacturing company of Bangladesh.

First and foremost, I extend my sincere appreciation to my advisor, **Ummah Tafsirun** for her invaluable guidance, and encouragement. Their expertise and insightful feedback have been instrumental in shaping this research and ensuring its quality.

I am also grateful to the faculty members of Department of business administration at Sonargaon University for their continuous support and for providing a conducive environment for academic growth. Their encouragement and dedication to teaching have greatly inspired me.

Special thanks to the professionals and managers in the Medical device manufacturing industry who generously shared their time, insights, and experiences during the interviews and data collection process. Their willingness to provide information and perspectives on supplier selection criteria has enriched this study and contributed to a deeper understanding of the industry’s challenges and opportunities.

I would like to acknowledge my fellow classmates and friends for their camaraderie, encouragement, constructive discussion throughout this research. Their support has made this journey more enjoyable and fulfilling.

Lastly, I wish to express my deepest appreciation to family for their unwavering support and belief in my abilities. Their encouragement and understanding during the demanding phase of this research have been my greatest motivation.

Thank you all for your contribution to this thesis and for being a part of my academic journey.

Executive Summary

This thesis investigates the supplier selection criteria in sustainable supply chains within the medical device manufacturing industry**,** with a focus on NIPRO JMI Company Ltd. The study assesses how supplier selection impacts operational efficiency, product quality, and competitiveness in the medical device sector. As the demand for medical devices continues to rise, driven by healthcare advancements and increasing global needs, effective supplier selection has become crucial for maintaining competitiveness and ensuring high-quality products in this dynamic market.

The study begins by exploring the theoretical framework surrounding supplier selection and supply chain management. Key concepts from established literature, such as supplier selection and supplier evaluation**,** are examined. The research methodology adopts a case study approach, focusing on medical device companies in Bangladesh. Data collection involved interviews with industry professionals, as well as an analysis of supplier records and performance metrics.

Key findings indicate that while many medical device companies have implemented basic supplier selection practices, significant challenges remain. These challenges include demand variability**,** supply chain disruptions**,** and rising raw material costs, which often result in inefficiencies such as excess inventory and stock outs**.** These inefficiencies can negatively impact customer satisfaction and profitability.

The study identifies several opportunities to optimize the supplier selection process within the medical device industry. Recommendations include the adoption of advanced forecasting techniques**,** the enhancement of supplier relationships, and the integration of technology to improve visibility and control over high-risk suppliers. Additionally, the research suggests that a robust supplier management framework tailored to the specific needs of the medical device sector would significantly enhance supply chain performance.

Ultimately, this thesis provides valuable insights and actionable recommendations for industry stakeholders, enabling them to navigate the complexities of supplier management and improve operational efficiency. The findings contribute to a deeper understanding of the critical role supplier selection plays in sustaining the growth and competitiveness of the medical device industry in Bangladesh.

List of Acronyms

SCM Supply Chain Management

CSR Corporate Social Responsibility

WHO World Health Organization

ISO International Organization for Standardization

KPI Key Performance Indicator

LCA Life Cycle Assessment

SRM Supplier Relationship Management

FDA Food and Drug Administration

MDR Medical Device Regulation

AHP Analytical Hierarchy Process

DEA Data Envelopment Analysis

TCO Total Cost of Ownership

TBL Triple Bottom Line

GMP Good Manufacturing Practices

ESG Environmental, Social, and Governance

BTS Blood Tubing Set

ERP Enterprise Resource Planning

CE Conformité Européenne (European Conformity)

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Chapter-01
Introduction

1.1 Introduction

In today's global business environment, sustainability has become a crucial consideration in supply chain management. Organizations are increasingly adopting sustainable practices to minimize environmental impact, enhance social responsibility, and ensure long-term economic viability. The medical device manufacturing industry, in particular, faces heightened scrutiny due to rigorous regulatory requirements, ethical considerations, and the need for high-quality, safe, and sustainable products.

Supplier selection is a critical element of supply chain sustainability, as suppliers significantly influence environmental performance, cost efficiency, product quality, and corporate social responsibility (CSR). Effective supplier selection involves assessing various criteria, including environmental impact, compliance with international standards, ethical labor practices, and operational efficiency.

This study explores the supplier selection criteria in sustainable supply chains, focusing on **NIPRO JMI Company Ltd.,** a leading medical device manufacturer in Bangladesh. By analyzing NIPRO JMI's supplier selection framework, this research aims to identify key factors influencing sustainable supplier decisions, challenges faced, and best practices in supplier evaluation. The study provides insights into how sustainability-driven supplier selection contributes to competitive advantage, regulatory compliance, and corporate sustainability goals.

1.2 Background of the Study

There are four trimesters in EMBA Program at **Sonargaon University** and in final trimester there are a thesis program. The program is an essential part of EMBA degree requirement, students are assigned to make a thesis report to demonstrate that they can do research advance the field and explain what they did in a clear, understandable manner that can advance the work of other researcher. The theoretical knowledge that we acquire from class lectures, books, journals, case study, seminar, project, workshop etc. is replenished in the practical setting. Here I also assigned to do a research and I choose the topic **"Supplier Selection Criteria in Sustainable Supply Chain Management: A Case Study on "NIPRO JMI Company Ltd."**

Sustainability in supply chain management has gained momentum due to rising environmental concerns, regulatory pressures, and consumer demand for ethically produced goods. The medical device industry, characterized by strict quality and safety standards, has begun participating sustainability into procurement and supplier management strategies. Medical device manufacturers must ensure that their suppliers adhere to environmental, social, and governance standards while maintaining efficiency, reliability, and compliance with healthcare regulations.

NIPRO JMI Company Ltd. is one of Bangladesh's leading medical device manufacturers, producing a wide range of healthcare products. As part of its commitment to sustainability, the company has adopted various measures to ensure environmentally friendly production, ethical labor practices, and resource-efficient operations. However, selecting sustainable suppliers remains a complex challenge, as it requires balancing cost, quality, and sustainability factors.

This study examines the current supplier selection criteria at NIPRO JMI and evaluates how sustainability is incorporated into decision-making. By assessing supplier evaluation processes, challenges, and opportunities, the research aims to provide recommendations for optimizing supplier selection in sustainable medical device supply chains.

1.3 Scope of the Study

The scope of this study encompasses the examination and evaluation of supplier selection criteria within the sustainable supply chains of the medical device manufacturing sector, with a specific focus on **NIPRO JMI Company Ltd.**. The study aims to assess how these criteria impact overall supply chain sustainability, operational efficiency, and the company's ability to meet regulatory and market demands for sustainable products. Given the medical device industry's crucial role in healthcare, the research focuses on identifying key sustainability challenges within the supplier selection process and exploring effective strategies that can be adopted to address them. Additionally, the study will analyze how **NIPRO JMI Company Ltd.** integrates environmental, social, and economic considerations into its supplier selection process to enhance the sustainability of its supply chain operations.

This research covers several core areas, including:

- **Operational Efficiency**: Assessing how supplier selection decisions influence operational efficiency, cost management, and resource utilization.
- **Sustainability Integration**: Investigating how sustainability considerations such as environmental impact, social responsibility, and economic sustainability are incorporated into the supplier selection process.
- **Compliance with Regulations**: Investigating how NIPRO JMI ensures that its supplier selection process aligns with industry regulations and sustainability standards.
- **Supplier Collaboration and Engagement**: Understanding the role of collaboration and engagement with suppliers in fostering sustainability and driving performance improvements.

The study is limited to the medical device manufacturing sector, with a specific focus on **NIPRO JMI Company Ltd.**, The research emphasizes the supplier selection criteria used by NIPRO JMI, particularly in relation to sustainability and its impact on the overall supply chain. The findings are intended to provide practical recommendations for industry stakeholders, including procurement managers, supply chain professionals, and policymakers, on optimizing supplier selection practices to enhance sustainability, operational efficiency, and regulatory compliance in the medical device supply chain. This research does not extend to the downstream sectors that use medical devices.

1.4 Objectives of the Study

Broad Objective:

The broad objective of this study is to examine and evaluate the supplier selection criteria within the sustainable supply chains of medical device manufacturers, with a specific focus on **NIPRO JMI Company Ltd.**. The research aims to assess how the integration of sustainability considerations in supplier selection can enhance the operational efficiency, regulatory compliance, and competitiveness of the company within the medical device sector.

Specific Objectives:

- To identify the key factors and criteria used by NIPRO JMI Company Ltd. in selecting suppliers for its medical device manufacturing processes, with a focus on sustainability aspects.
- To assess how sustainability criteria, including environmental, social, and economic factors, influence supplier selection decisions at NIPRO JMI Company Ltd.
- To evaluate the impact of supplier selection on the overall sustainability of NIPRO JMI's supply chain**,** particularly in terms of operational efficiency, cost management, and supply chain performance**.**
- To explore the role of NIPRO JMI's supplier selection process in ensuring compliance with global and local sustainability regulations and standards within the medical device industry**.**
- To analyze the challenges faced by NIPRO JMI in integrating sustainability into supplier selection and identify strategies to address these challenges.
- To examine the impact of supplier selection on the company's competitive advantage within the medical device market, focusing on the growing demand for sustainable products.
- To provide recommendations for improving supplier selection practices at NIPRO JMI Company Ltd., aiming to enhance supply chain sustainability and performance in line with industry best practices.

These specific objectives guide the research in comprehensively understanding the impact and significance of inventory management within medical device manufacturing

1.5 Quantitative Research

Drawing from my educational background, I have acquired various research methodologies. This study provided me with the chance to apply my academic knowledge in a real-world context. Data collection predominantly involved secondary sources**.**

Primary Sources:

These are the first-hand data you plan to collect directly from **NIPRO JMI** and its inventory management practices.

- Face-to-Face or Direct Observation
- Inventory Records and turnover rate Analysis
- Company Records (Data)
- Lead Times and Order Quantities
- Dispatching Finished Goods

Secondary Sources:

Secondary data will help provide context and compare NIPRO JMI's practices with industry standards.

- **Review of organization records**:

  Organization research provides statistical data and established theories on supply chain and inventory management in medical device manufacturing. It can offer insights into the latest models and methods for optimizing inventory management that NIPRO JMI can compare itself against.

- **Analysis of Books**:

  Books on supply chain management can help build the theoretical framework for your research, giving context to your quantitative findings from the primary sources. For instance, looking at how other companies have successfully integrated sustainable supplier selection criteria could provide benchmarks.

- **Literature Benchmarking**:

  Industry-specific benchmarks from academic literature will allow you to assess the performance of **NIPRO JMI** against standards from other companies globally or within the region. Quantitative benchmarks for lead times, inventory turnover, and sustainability metrics will allow you to assess whether NIPRO JMI's practices are on par with industry standards or if improvements are needed.

The findings from this research will provide valuable insights for NIPRO JMI and similar companies in terms of selecting suppliers based on sustainability criteria while maintaining efficient supply chain practices. Research methodology helps ensure that the study is rigorous, objective, and based on reliable data, leading to practical recommendations for improving the sustainability of supply chain.

1.6 Limitations of the Study

While this study aims to provide valuable insights into the supplier selection criteria and sustainable supply chains in the medical device manufacturing sector, specifically in the context of **NIPRO JMI Company Ltd.**, there are several limitations that should be acknowledged:

- **Scope of Data Collection**: The study relies heavily on secondary data, which may limit the scope of analysis, as it depends on available historical data and existing records. While this provides a solid foundation, it may not fully capture real-time or recent changes in supply chain processes, inventory management practices, or supplier performance.
- **Primary data collection** is somewhat limited due to access restrictions and potential confidentiality concerns within the company, which may hinder direct interviews or observational studies of employees involved in the supplier selection process.
- **Data Accessibility and Availability**: Some critical data, such as supplier performance metrics, lead times, and detailed financial records, may be difficult to obtain due to privacy concerns or corporate confidentiality agreements. This may limit the depth of analysis on how sustainability criteria specifically influence supplier performance and the overall supply chain efficiency.
- **Limited supplier data**: Detailed data on suppliers, particularly regarding their sustainability practices and performance, may not always be available or accessible, as companies may not openly share such metrics for competitive reasons.
- **Time Constraints**: Due to the time-bound nature of academic research, there may be limitations in the amount of data that can be collected or analyzed. The study focuses on specific aspects of supplier selection and sustainable supply chain practices, which may not fully capture the entire complexity of the supply chain management process at NIPRO JMI.
- **Data collection period**: The period for data collection may not fully account for seasonal variations or long-term trends in supplier performance or supply chain efficiency, thus providing a snapshot rather than a comprehensive analysis over time.
- **Subjectivity in Data Interpretation**: Although efforts will be made to quantify the data, some level of subjectivity may remain in interpreting qualitative data from secondary sources or observational findings. Variations in how sustainability criteria

are defined, understood, and implemented could affect the consistency and objectivity of the analysis.

- **Bias in secondary sources**: The secondary data (such as academic journals, industry reports, and books) might reflect specific perspectives or industry biases that could influence how supplier selection criteria and sustainability practices are viewed.

These limitations highlight the challenges faced during the research process and suggest areas for future research to build upon the findings of this study.

Chapter-02

Literature Review

2.1 Introduction

The selection of suppliers is a crucial aspect of sustainable supply chain management, particularly in the medical device manufacturing industry. Ensuring sustainability in supplier selection not only enhances operational efficiency but also aligns with regulatory compliance, environmental considerations, and corporate social responsibility (CSR). This chapter reviews existing literature on supplier selection criteria, sustainability in supply chains, and their relevance to the medical device manufacturing sector. (Abrams, FW, 1951)

2.2 Supplier Selection Criteria

Supplier selection involves multiple criteria that balance cost, quality, sustainability, and reliability. Traditional supplier selection models often prioritize cost and quality, but recent approaches integrate environmental and social sustainability. Key selection criteria include:

- **Cost Efficiency**: Suppliers must offer competitive pricing while maintaining quality standards. (Dickson, G. W., 1966).
- **Quality Standards**: Compliance with industry standards such as ISO 13485:2016 for medical devices is essential. (Kannan, V. R., & Tan, K. C., 2002)
- **Sustainability Practices**: Environmental impact, waste management, and energy efficiency are critical in supplier evaluation. (Srivastava, S. K., 2007)
- **Social Responsibility**: Ethical labor practices, fair wages, and corporate social responsibility initiatives. (Mani, V., Agrawal, R., & Sharma, V., 2015).
- **Delivery Performance**: Timely and reliable delivery to ensure uninterrupted production.
- **Technological Capability**: Suppliers' ability to adopt innovative manufacturing technologies. (Christopher, M., & Peck, H., 2004).

2.3 Sustainability in Supply Chains

Sustainable supply chains incorporate environmental, social, and economic aspects to minimize negative impacts. Studies suggest that sustainable procurement practices lead to long-term benefits, including cost reduction, enhanced brand reputation, and regulatory compliance. The triple bottom line (TBL) approaches People, Planet, and Profit guides' sustainable supplier selection.

2.3.1 Environmental Sustainability

Environmental considerations in supplier selection include carbon footprint reduction, waste management, resource conservation, and adherence to environmental regulations. (Srivastava, S. K., 2007).

2.3.2 Social Sustainability

Social sustainability ensures fair labor practices, occupational health and safety, and ethical sourcing. Many firms adopt SA8000 certification and other ethical sourcing frameworks. (Carter, C. R., & Jennings, M. M., 2002).

2.3.3 Economic Sustainability

Economic sustainability focuses on suppliers' financial stability, cost competitiveness, and long-term viability. (Carter, C. R., & Rogers, D. S., 2008)

2.4 Supplier Selection Models

Several models exist for evaluating suppliers in sustainable supply chains, including:

- **Analytical Hierarchy Process (AHP)**: A structured approach to ranking suppliers based on multiple criteria. (Ho, W., Xu, X., & Dey, P. K., 2010)
- **Data Envelopment Analysis (DEA)**: A mathematical model for evaluating supplier efficiency. (Kumar, A., Jain, V., & Kumar, S., 2014)
- **Life Cycle Assessment (LCA)**: A method to evaluate the environmental impact of suppliers over their product life cycle. (Rebitzer, G., et al., 2004)

2.5 Supplier Selection in the Medical Device Manufacturing Industry

The medical device industry has stringent supplier selection requirements due to regulatory compliance (e.g., ISO 13485:2016). Sustainability in this sector ensures product safety, ethical sourcing, and environmental responsibility.

2.5.1 Regulatory Compliance

Medical device manufacturers must comply with various regulatory frameworks such as:

- **ISO 13485**: Quality management system for medical devices.
- **FDA Regulations**: Compliance with US Food and Drug Administration requirements.
- **European Medical Device Regulation (MDR)**: Stringent guidelines for medical device safety. (Hussain, M., Tapinos, E., & Knight, L., 2017).

2.5.2 Sustainability Challenges

Challenges in implementing sustainability in supplier selection include high costs, lack of standardized frameworks, and resistance to change from suppliers. (Ashby, A., Leat, M., & Hudson-Smith, M., 2012)

2.6 Supplier Selection Frameworks and Models

Various frameworks and models assist in supplier selection for sustainable supply chains. Some widely used models include:

2.6.1 Analytical Hierarchy Process (AHP)

AHP is a decision-making tool that evaluates multiple criteria by assigning weights to each factor, helping manufacturers select the most sustainable suppliers. (Saaty, T. L., 1980)

2.6.2 Total Cost of Ownership (TCO)

TCO considers direct and indirect costs associated with a supplier, including transportation, maintenance, and environmental impact. This approach ensures cost-effective and sustainable supplier selection. (Ferrin, B. G., & Plank, R. E., 2002)

2.6.3 Life Cycle Assessment (LCA)

LCA evaluates the environmental impact of products from raw material extraction to disposal. It helps manufacturers select suppliers with minimal ecological footprint. (Huang, Y., Weber, C., & Fiala, P., 2009)

Chapter-03

Organization Overview

3.1 Introduction

The medical device industry is a critical sector that ensures the availability of essential healthcare products globally. As a key player in this industry, NIPRO JMI Company Ltd. has established itself as a leading manufacturer of high-quality medical devices in Bangladesh. The company specializes in producing a wide range of medical solutions, including syringes, infusion sets, catheters, and diagnostic kits, to cater to both local and international markets.

Given the sensitive nature of medical devices, supplier selection is a crucial aspect of NIPRO JMI's supply chain management. The company operates in a competitive and highly regulated environment, requiring robust supplier selection criteria to ensure the procurement of high-quality raw materials while maintaining cost efficiency and sustainability. This chapter provides an overview of NIPRO JMI, its core operations, supply chain structure, and the supplier selection criteria employed to enhance sustainability in its supply chain management.

3.2 Vision

To utilize business as a catalyst for enhancing the material and social well-being of investors, employees, and society, fostering financial and ethical progress as part of human civilization. Our goal is to become a global leader in the medical device manufacturing industry, recognized for excellence in quality, innovation, and sustainability, while ensuring superior patient care.

3.3 Mission

To play a pivotal role in business operations while ensuring value creation for shareholders, stakeholders, and society. We strive to build strong partnerships with customers, employees, and the environment.

- To manufacture and deliver high-quality medical devices that meets international standards and exceeds customer expectations.
- To establish a sustainable supply chain by collaborating with responsible suppliers who prioritize quality, efficiency, and ethical practices.
- To integrate innovation and advanced technology into production and supply chain processes for enhanced operational efficiency.

- To contribute to global healthcare by ensuring the availability of safe, reliable, and cutting-edge medical devices.

3.4 Core Operations

NIPRO JMI's core operations span from sourcing raw materials to manufacturing, quality control, packaging, and distribution. The company ensures compliance with international regulatory standards such as ISO and WHO guidelines. NIPRO JMI adopts advanced manufacturing techniques to maintain high precision and reliability in medical device production, making it a trusted name in the industry.

3.5 Supply Chain and Supplier Selection Criteria

Supplier selection plays a pivotal role in ensuring the efficiency and sustainability of NIPRO JMI's supply chain. The company follows a structured approach to selecting suppliers based on critical criteria, ensuring compliance with quality, ethical, and environmental standards. The key supplier selection criteria include:

- **Quality Assurance**: Suppliers must adhere to international quality standards such as ISO 13485 and Good Manufacturing Practices (GMP) to ensure the reliability and safety of raw materials.
- **Regulatory Compliance**: Compliance with local and global regulatory requirements is mandatory for all suppliers to maintain consistency and avoid legal risks.
- **Sustainability Commitment**: NIPRO JMI prioritizes suppliers that implement environmentally friendly practices, such as waste reduction, energy efficiency, and responsible sourcing.
- **Cost Efficiency**: Competitive pricing without compromising quality is a key consideration to maintain cost-effective production.
- **Reliability and Consistency**: Suppliers must have a proven track record of timely deliveries and consistent supply to avoid disruptions in the production process.
- **Innovation and Technological Capability**: Suppliers that invest in research and technological advancements align with NIPRO JMI's goal of continuous innovation.
- **Corporate Social Responsibility (CSR) Compliance**: Ethical sourcing, fair labor practices, and community engagement are crucial factors in supplier evaluation.

3.6 Commitment to Sustainability

NIPRO JMI integrates sustainability into its supply chain by selecting suppliers that adhere to eco-friendly practices, such as reducing carbon footprints and minimizing waste. The company also promotes the use of biodegradable and recyclable materials in its manufacturing processes, reinforcing its commitment to environmental responsibility.

3.7 Supplier Relationship Management

To maintain a strong supplier network, NIPRO JMI engages in long-term partnerships with key suppliers, ensuring mutual growth and operational excellence. The company conducts periodic supplier evaluations to monitor performance, assess risks, and implement improvement plans where necessary.

3.8 Logistics and Distribution

NIPRO JMI operates a robust logistics and distribution network to ensure the seamless delivery of medical devices across domestic and international markets. The company strategically manages its inventory to prevent shortages and optimize supply chain efficiency.

3.9 Organizational Organogram

The organizational structure of NIPRO JMI Company Ltd.'s supply chain is designed to ensure efficient operations, quality control, and sustainable sourcing of materials, crucial in the medical device industry. At the top, the CEO oversees the overall company strategy, including supply chain management. The COO is responsible for day-to-day operations, ensuring smooth functioning across procurement, manufacturing, and delivery processes.

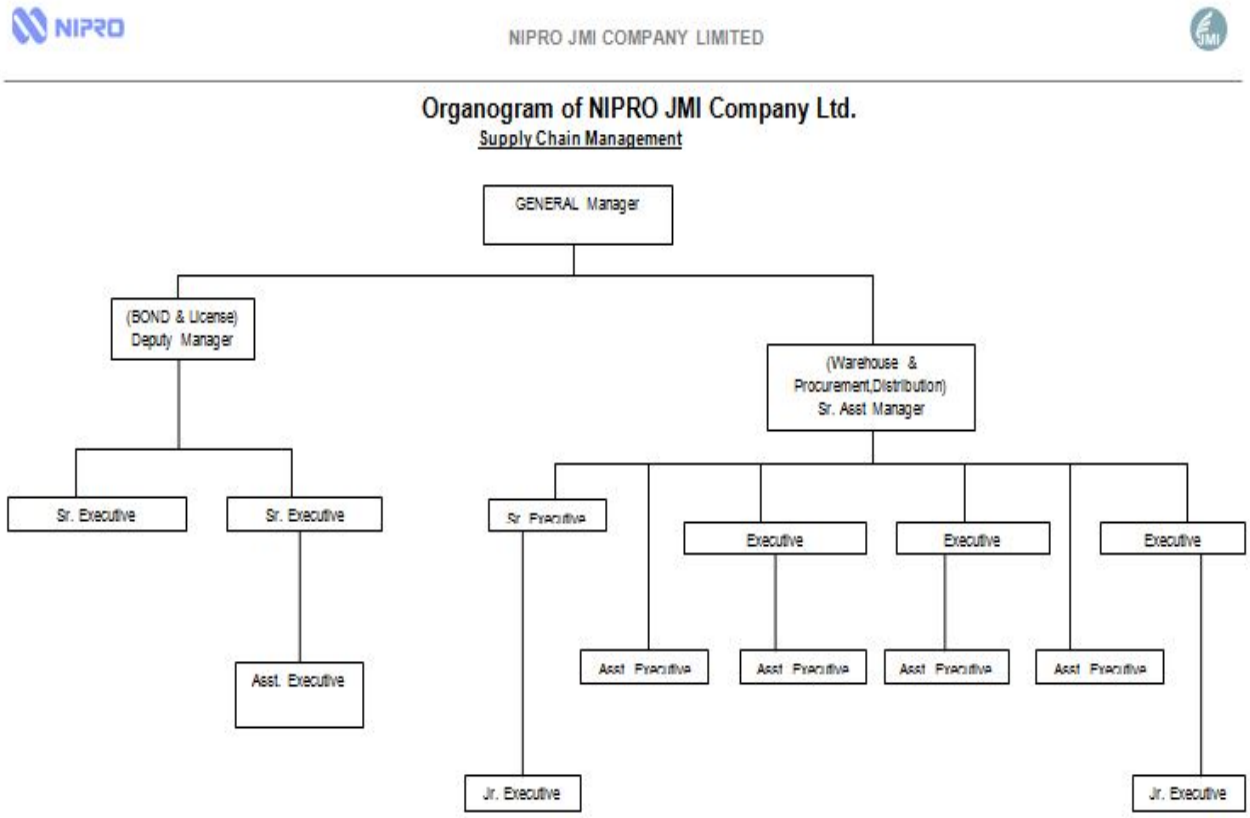
Key departments within the supply chain include:

- **Supply Chain and Procurement**: This department manages supplier relationships, sourcing, and inventory. Key roles include the Supply Chain Manager, Procurement Manager, and Logistics Manager.
- **Sustainability Officer/Manager**: Ensures sustainable sourcing practices and evaluates suppliers based on environmental, social, and governance (ESG) criteria.

- **Logistics and Warehouse Management**: Manages material storage, handling, and transportation.

This interconnected structure ensures that NIPRO JMI's supply chain is aligned with the company's core values of sustainability, quality, and compliance, fostering an efficient and sustainable operation.

Supply Chain Organogram of NIPRO JMI Company Ltd.



3.10 NIPRO JMI Services

- **Company Name**: NIPRO JMI Company Ltd.
- **Industry**: Medical device manufacturing.
- **Established**: 1999
- **Core Products**:

    - Blood Tubing set (BTS)
    - Syringes and infusion sets.
    - Catheters and dialysis equipment.
    - Diagnostic and surgical instruments.
    - Home healthcare products.
- **Operations**:
    - Production and processing of high-quality medical devices.
    - Supply chain management and distribution.
    - Research and development for innovative solutions.
- **Infrastructure**:
    - State-of-the-art manufacturing plants equipped with advanced technology.
    - Warehouses and distribution centers ensuring seamless inventory management.
- **Supply Chain Approach**:
    - Sustainable and ethical procurement practices.
    - Efficient inventory management strategies to reduce waste and optimize resources.
    - Strong supplier partnerships to ensure consistent supply.
- **Competitive Edge**:
    - Commitment to international quality and safety standards.
    - Adoption of advanced technologies for product innovation.
    - Strong CSR initiatives and environmental responsibility.

3.11 NIPRO JMI Clients

- **Hospitals and Clinics**: Providing essential medical devices for patient care.
- **Pharmaceutical Companies**: Supplying diagnostic and infusion therapy solutions like, Beximco, Health care pharma, ACI pharma, Incepta Pharma
- **Government and Public Health Organizations**: Partnering for large-scale healthcare projects.
- **Export Market Partners**: Supplying medical devices to international healthcare markets over 41 contries in Asia, Europe, Latin America, The middle East, and Africa

3.12 Major Medical Device Manufacturers in Bangladesh

- NIPRO JMI Company Ltd.
- JMI Group (JMI Syringes & Medical Devices Ltd.)
- Beximco Pharmaceuticals Ltd. (Medical Device Division)
- Get Well Limited
- Popular Pharmaceuticals Ltd. (Medical Devices Unit)

These manufacturers play a crucial role in advancing Bangladesh's healthcare sector by producing high-quality medical devices to meet the growing demand for reliable healthcare solutions.

Chapter-04

Analysis of Supplier Selection Criteria

4.1 Introduction

Supplier selection plays a critical role in ensuring the long-term success of any manufacturing organization, particularly in the medical device sector. In an industry where quality, compliance, and sustainability are non-negotiable, selecting the right suppliers becomes a crucial component of the supply chain. For NIPRO JMI Company Ltd., one of the leading manufacturers of medical devices in Bangladesh, the choice of suppliers significantly impacts the company's ability to meet regulatory standards, maintain product quality, and achieve sustainability goals. This chapter analyzes the supplier selection criteria in NIPRO JMI's sustainable supply chain practices, with a focus on ensuring that both economic and environmental factors are prioritized.

4.2 Objectives of the Analysis

The main objectives of this analysis are to:

- Assess the current supplier selection criteria used by NIPRO JMI Company Ltd. in its supply chain.
- Examine the sustainability factors integrated into the supplier selection process.
- Identify challenges faced by NIPRO JMI in selecting sustainable suppliers.
- Evaluate the impact of supplier selection on the overall sustainability and performance of the supply chain.
- Recommend strategies to improve the supplier selection process for enhanced supply chain sustainability.

4.3 Supplier Selection Criteria

The process of selecting suppliers is integral to building a sustainable supply chain. NIPRO JMI has developed a set of criteria to evaluate suppliers on multiple aspects:

4.3.1 Quality Standards

Ensuring that suppliers meet stringent quality control standards is a fundamental criterion for NIPRO JMI. As a medical device manufacturer, the company adheres to regulatory standards such as ISO 13485 (Medical Devices Quality Management Systems) to maintain high product quality.

4.3.2 Sustainability Practices

Sustainability is at the forefront of NIPRO JMI's supplier selection process. The company seeks suppliers that demonstrate sustainable practices, such as:

- Adopting environmentally friendly production methods.
- Minimizing carbon footprints.
- Complying with environmental regulations and certifications (e.g., ISO 14001).

4.3.3 Cost Efficiency

While sustainability is a priority, NIPRO JMI also considers the cost-effectiveness of suppliers. The company evaluates suppliers based on their ability to provide competitive prices without compromising product quality or sustainability.

4.3.4 Delivery and Lead Time

Suppliers are assessed on their ability to meet deadlines and provide timely deliveries. Shorter lead times are crucial for ensuring efficient production schedules in the medical device sector, where time is a critical factor in product availability.

4.3.5 Ethical Practices and Compliance

NIPRO JMI places significant emphasis on ethical practices. Suppliers must demonstrate adherence to local and international labor laws, anti-corruption regulations, and overall ethical business conduct.

4.4 Sustainable Supplier Performance Evaluation

The performance of suppliers is continuously evaluated to ensure they meet NIPRO JMI's sustainability goals. Key performance indicators (KPIs) used to assess suppliers include:

- **Environmental Impact:** Measuring carbon footprint, waste reduction, and energy efficiency.
- **Social Responsibility:** Assessing labor practices, worker safety, and community involvement.

- **Economic Sustainability:** Evaluating the financial stability of suppliers to ensure long-term partnership viability.

4.5 Supplier Relationship Management (SRM)

NIPRO JMI focuses on building long-term relationships with suppliers based on trust, transparency, and collaboration. Through a robust Supplier Relationship Management (SRM) system, the company fosters open communication with suppliers to ensure continuous improvement in sustainability and performance.

4.5.1 Collaborative Partnerships

Rather than a transactional relationship, NIPRO JMI seeks to create partnerships with its suppliers, encouraging collaboration in areas such as product innovation, process improvements, and sustainable practices.

4.5.2 Risk Management

To mitigate risks in the supply chain, NIPRO JMI works closely with suppliers to address potential vulnerabilities, whether they stem from environmental disruptions, regulatory changes, or logistical issues.

4.6 Supplier Sustainability Audits

As part of its supplier selection process, NIPRO JMI regularly conducts sustainability audits of potential and existing suppliers. These audits focus on:

- Compliance with environmental regulations.
- Waste management practices.
- Worker health and safety standards.

These audits are critical to ensuring that suppliers not only meet the technical and quality requirements but also adhere to the company’s sustainability goals.

4.7 Challenges in Supplier Selection

Despite a rigorous selection process, NIPRO JMI faces several challenges in choosing suppliers for its sustainable supply chain:

4.7.1 Limited Availability of Sustainable Suppliers

The availability of suppliers who meet both quality and sustainability criteria can be limited, especially in the local market. This can sometimes result in higher procurement costs or longer lead times.

4.7.2 Supplier Resistance to Change

Some suppliers may be reluctant to adopt sustainable practices due to cost concerns or lack of awareness. Overcoming this resistance requires education, clear communication, and sometimes, financial incentives.

4.7.3 Supply Chain Disruptions

External factors such as political instability, natural disasters, or global supply chain disruptions can affect the reliability and sustainability of suppliers.

4.8 Impact of Supplier Selection on Supply Chain Performance

The supplier selection process directly impacts the sustainability and performance of NIPRO JMI's supply chain. Key benefits include:

- **Improved Sustainability:** The use of environmentally responsible suppliers helps reduce the carbon footprint of the company's operations.
- **Regulatory Compliance:** Partnering with suppliers who adhere to regulatory standards ensures smooth market access and compliance with industry regulations.
- **Cost Control:** By selecting cost-effective, reliable suppliers, NIPRO JMI can keep production costs in check while maintaining high-quality standards.

4.9 Recommendations for Improving Supplier Selection

To enhance the sustainability of its supply chain, NIPRO JMI can consider the following recommendations:

- **Expand Supplier Network:** Explore new suppliers in international markets who meet sustainability standards.
- **Supplier Development Programs:** Implement training and development programs to help existing suppliers adopt more sustainable practices.
- **Incentivize Sustainability:** Offer incentives for suppliers that make significant improvements in their environmental and social practices.

In conclusion, effective supplier selection is vital for building a sustainable and efficient supply chain in the medical device industry. NIPRO JMI's criteria, focusing on quality, cost, and sustainability, ensure a robust supply chain. By refining these criteria and fostering collaborative supplier relationships, NIPRO JMI strengthens its market position. This chapter provides a comprehensive analysis of the company's supplier selection practices. It highlights the importance of sustainability in the selection process and offers insights into improving supply chain performance. Ultimately, NIPRO JMI's approach contributes to both business success and broader sustainability objectives.

Chapter-05

Findings

5.1 Findings

The study on supplier selection criteria in sustainable supply chains in the medical device manufacturing sector, specifically at NIPRO JMI Company Ltd., has revealed important insights into the strengths, challenges, and opportunities for improvement in the company's supply chain practices. The findings and their analysis are outlined below:

Limited Supplier Diversification

- **Risk of Disruptions:** A heavy reliance on a few suppliers for critical materials increases the risk of disruptions due to external factors such as economic shifts, natural disasters, or geopolitical tensions.
- **Reduced Flexibility:** The lack of supplier diversification limits the company's ability to adapt to changes in the market and demand fluctuations.
- **Supplier Bargaining Power:** Fewer suppliers result in limited negotiating leverage, potentially leading to higher procurement costs and unfavorable terms.

Lack of Supplier Performance Evaluation

- **Inconsistent Quality Control:** The absence of a robust system to evaluate supplier performance can result in inconsistencies in product quality, which affects the overall manufacturing process.
- **Missed Improvement Opportunities:** Without performance reviews and feedback loops, suppliers may not have the necessary information to improve, leading to sustained inefficiencies and quality issues.
- **Unclear Expectations:** A lack of structured performance metrics can create confusion and misalignment between the company and its suppliers.

Sustainability Integration Challenges

- **Difficulty in Assessing Sustainability Practices:** The absence of clear sustainability criteria for supplier selection leads to challenges in identifying suppliers who adhere to sustainable practices, particularly in waste reduction, resource conservation, and environmental impact mitigation.

- **Cost Implications:** Suppliers with robust sustainability practices often require higher upfront costs, making it challenging for the company to balance cost-effectiveness with environmental goals.

Limited Technological Integration in Supplier Selection

- **Manual Processes:** The reliance on manual supplier selection processes creates inefficiencies, leading to errors, delays, and a lack of real-time data analysis in decision-making.
- **Inefficient Communication:** Without integrated systems, supplier communications are often delayed, resulting in inefficient operations and missed opportunities for collaboration.

Inadequate Risk Management Framework

- **Impact on Operations:** A lack of contingency planning increases vulnerability to disruptions, leading to delays in production and product delivery to customers.
- **Unpreparedness for Crisis Situations:** The company's inability to anticipate and mitigate risks through strategic supplier diversification or alternative sourcing practices leads to operational inefficiencies.

Quality Assurance and Regulatory Compliance Gaps

- **Inconsistent Compliance:** Variability in suppliers' adherence to quality standards and regulatory requirements leads to potential product recalls, legal issues, and customer dissatisfaction.
- **Increased Inspection Costs:** The lack of standardization and inconsistency in supplier quality necessitates more frequent inspections and higher operational costs.
- **Inability to Meet Industry Standards:** Failing to select suppliers who meet required industry regulations can lead to regulatory penalties and reputational damage.

High Dependency on Single Vendor

- **Limited Supplier Flexibility:** Vendor dependence reduces the company's bargaining power, leading to potential higher costs and limitations in negotiating terms.

- **Production Delays:** A single point of failure in the vendor relationship can result in significant production delays, affecting delivery timelines and overall customer satisfaction.

Challenges in Supplier Relationship Management

- **Communication Barriers:** Ineffective communication channels between the company and suppliers lead to misunderstandings and delays in fulfilling orders.
- **Missed Value-Added Opportunities:** The company's inability to nurture supplier relationships results in missed opportunities for suppliers to add value beyond basic product provision, such as providing insights into new technologies or cost-saving innovations.

Cost Implications of Sustainable Sourcing

- **Higher Upfront Costs:** Selecting suppliers with sustainable practices often entails higher initial costs, which may be seen as a barrier to adoption.
- **Balancing Cost with Sustainability:** The company faces challenges in balancing cost-effectiveness with the implementation of sustainability measures in its supply chain.

Inadequate Forecasting and Demand Planning

- **Inaccurate Demand Forecasting:** Insufficient data-driven demand forecasting leads to stock outs or overstocking of materials, affecting production schedules and customer delivery timelines.
- **Ineffective Coordination with Suppliers:** The lack of accurate forecasting data hinders effective communication with suppliers, causing delays or disruptions in material availability.
- **Missed Cost-Saving Opportunities:** Poor demand planning leads to wasted resources, increased costs, and inefficiencies throughout the supply chain.

Supply Chain Transparency Issues

- **Limited Visibility into Supplier Practices:** The lack of transparency from suppliers regarding their operations, sourcing practices, and environmental impacts make it difficult for the company to ensure that its sustainability standards are met.
- **Trust Deficit:** Limited visibility into the supplier's processes can undermine trust and hinder the ability to manage risks effectively.
- **Difficulty in Auditing:** Without clear supply chain transparency, the company struggles to conduct effective audits and ensure that suppliers meet required quality, ethical, and sustainability standards.

Chapter-06

Recommendation & Conclusion

6.1 Recommendations

Based on the findings and analysis, the following recommendations are proposed to enhance the supplier selection criteria for sustainable supply chains at NIPRO JMI Company Ltd., a medical device manufacturer:

Integration of Technology in Supplier Selection

- **Implement Advanced Supplier Management Software:** Deploy Enterprise Resource Planning (ERP) systems or specialized supplier relationship management (SRM) software to automate and streamline the supplier selection process, performance tracking, and supplier evaluations.
- **Utilize Data Analytics for Supplier Evaluation:** Leverage predictive analytics and data-driven tools to assess supplier reliability, performance, and sustainability practices based on historical data, market trends, and past performance metrics.
- **Adopt Block chain for Transparency:** Explore block chain technology to enhance supply chain transparency, providing real-time, immutable records of supplier practices, sustainability compliance, and product provenance.

Enhance Supplier Sustainability Evaluation Criteria

- **Establish Clear Sustainability Metrics:** Develop and incorporate specific sustainability criteria into the supplier selection process, focusing on environmental impact, energy efficiency, waste reduction, and resource management.
- **Encourage Green Certifications and Eco-Friendly Practices:** Prioritize suppliers with certified sustainability credentials (e.g., ISO 14001, LEED, etc.) and eco-friendly production practices to ensure alignment with the company's environmental goals.
- **Implement Supplier Audits for Sustainability:** Regularly audit suppliers to ensure compliance with environmental regulations, ethical sourcing practices, and responsible manufacturing standards.

Diversify Supplier Base

- **Expand Supplier Network:** Actively seek out additional suppliers to mitigate risks related to single-source dependency. A diversified supplier base helps reduce supply chain disruptions and increases bargaining power.
- **Establish Alternative Sourcing Strategies:** Develop alternative sourcing options and contingency plans to ensure a stable supply of critical materials, especially during disruptions caused by geopolitical, economic, or environmental factors.

Implement Supplier Performance Evaluation System

- **Set Clear Performance Metrics:** Establish clear performance metrics to evaluate suppliers based on quality, on-time delivery, cost efficiency, and sustainability. These metrics should be regularly reviewed to ensure suppliers are meeting performance expectations.
- **Create a Supplier Rating System:** Develop a supplier rating or scorecard system that provides transparent and measurable data on supplier performance, highlighting areas for improvement and fostering accountability.
- **Regular Performance Reviews:** Conduct regular supplier performance reviews to address issues proactively and identify opportunities for collaboration, process improvements, or cost savings.

Strengthen Risk Management Framework

- **Develop a Supplier Risk Management Strategy:** Create a comprehensive risk management framework that includes identifying potential risks such as financial instability, quality issues, regulatory non-compliance, and natural disasters, which could affect supplier performance.
- **Implement Risk Mitigation Strategies:** Establish contingency plans for critical suppliers, including alternative sourcing, increased inventory, and strengthened communication channels to handle disruptions effectively.
- **Monitor Supplier Financial Health:** Regularly assess the financial stability of key suppliers to minimize the risk of supply chain disruptions due to supplier insolvency or financial failure.

Promote Collaboration and Communication with Suppliers

- **Improve Communication Channels:** Strengthen communication between NIPRO JMI Company Ltd. and its suppliers through shared digital platforms, real-time data exchange, and regular collaborative meetings to ensure alignment on quality standards, delivery timelines, and sustainability goals.
- **Foster Joint Problem Solving:** Develop collaborative problem-solving mechanisms to address production or quality challenges in a timely and efficient manner, ensuring that both parties work together to overcome obstacles.

Improve Supplier Compliance with Regulatory Standards

- **Ensure Regulatory Compliance:** Ensure that all selected suppliers adhere to industry regulations and standards, such as ISO 13485 for medical devices and relevant local or international regulatory requirements (FDA, CE, etc.).
- **Develop Compliance Audits:** Conduct regular audits to ensure that suppliers comply with quality management systems and industry-specific regulatory requirements. Failure to meet compliance should result in corrective actions or reevaluation of the supplier relationship.

Focus on Cost and Value Optimization

- **Balance Cost with Sustainability:** While it is important to keep costs competitive, prioritize long-term value over short-term savings. Focus on selecting suppliers that offer the best balance between cost, quality, and sustainability rather than solely looking for the cheapest option.
- **Focus on Total Cost of Ownership (TCO):** Consider the total cost of ownership when evaluating suppliers, which includes not just the upfront cost but also factors like quality, maintenance, longevity, and sustainability impacts.

Implement a Continuous Improvement Program for Supplier Selection

- **Continuous Supplier Improvement:** Encourage suppliers to adopt continuous improvement programs, focusing on increasing efficiency, reducing waste, and

enhancing product quality. Provide feedback and incentivize suppliers who demonstrate improvements.

- **Regular Supplier Performance Benchmarking:** Continuously benchmark supplier performance against industry standards and best practices to identify potential areas for improvement and keep suppliers competitive.

Monitor and Evaluate Supplier Sustainability Initiatives

- **Track Supplier Sustainability Progress:** Regularly monitor suppliers' sustainability efforts and progress against set goals to ensure they remain aligned with the company's overall sustainability objectives.
- **Report on Sustainability Metrics:** Include sustainability performance metrics as part of supplier performance reviews, ensuring transparency in the company's sustainable sourcing efforts.

6.2 Conclusion

The supplier selection criteria for NIPRO JMI Company Ltd. play a critical role in ensuring the effectiveness and sustainability of its supply chain. Currently, the company faces challenges such as vendor dependency, inconsistent supplier performance, and inadequate integration of sustainability practices. By implementing the recommended strategies—such as integrating advanced technology for supplier management, enhancing supplier evaluation processes, diversifying the supplier base, and emphasizing sustainability criteria—the company can significantly improve its supplier selection process.

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