



Research Paper

AN ASSESSMENT OF MANUFACTURING LOGISTICS: A CASE OF NAVIN FLUORINE INTERNATIONAL LTD

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In today's dynamic scenario it is difficult for organization to achieve continued growth owing to factors like liberalization, globalization and increasing competition. With increasingly competitive and globalize world market, firms are constantly under pressure to find ways to cut material and production costs. Since a qualified and reliable supplier is a key element and a good source for a buyer in reducing production and material costs. Evaluation of suppliers is an important component of supply chain management. Supplier Evaluation is the process of finding the suppliers being able to provide the buyer with the right quality products and services at the right price, at the right quantity and at the right time. Supplier evaluation is one of the most critical functions for the success of an organization. Supplier Evaluation process becomes increasingly important for most manufacturing firms as it helps to reduce directly cost to the bottom line. This work presents an evaluation process of supplier selection in Navin Fluorine International Ltd. using a simple rating method. This project also focuses the quality management system, documentation process, and purchasing process of Navin Fluorine International Ltd.

Keywords: SCM, Supplier evaluation process, Quality management, Purchasing, Force field analysis

INTRODUCTION

Overview and Motivation

Supplier Evaluation is considered as an important characteristic in the field of supply chain management. Many companies are implementing the concept of supply chain management today.

According to Whitman *et al.* a supply chain is defined as “A web of autonomous enterprises collectively responsible for satisfying the customer by creating an extended enterprise that conducts all phases of design, procurement, manufacturing and distribution of products”.

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In today's competitive operating environment the evaluation and selection of potential suppliers is becoming a more important and critical decision. Reveals that many firms are reducing their number of suppliers and the supplier base may provide a company with a strategic competitive advantage.

As firms increasingly emphasize cooperative relationships with critical suppliers, executives of buyer firms are using Supplier Evaluations to ensure that their performance objectives are met. The utilization purpose of Supplier Evaluation is to develop and maintain a competitive advantage in the marketplace.

In any organization for an effective supply chain management to operate, the purchasing function is very essential to perform effectively. It is the responsibility of purchasing managers to choose suppliers to purchase the required products for their company. Thus, it is very important for purchasing managers to choose the best supplier amongst all suppliers.

COMPANY INTRODUCTION

Navin Fluorine Industries is India's one of the largest fluoro chemical manufacturer company. Ranked amongst top fluoro chemical industries in India. Navin Fluorine Industries is well positioned today in its quest to become a research based chemical company.

Presently around 125 personnel are involved in Navin Fluorine activities including marketing function located at the corporate office in Bombay.

The site in Dewas has hi-tech production facility with skilled personnel to run the plant in

three shifts. The operational activities are supported by well-equipped analytical laboratory and dedicated R&D centers for continuous improvements with respect to technology up-gradation and improvement in productivity.

The products of Navin Fluorine are specialty chemicals for use in dyestuffs, drugs, pesticides, explosives, explosive stabilizer, plasticizers, additives in rocket propellant, aerosol, colour developers.

Keeping in view the dynamic market scenario, Navin Fluorine is continuously updating the product mix from a wide portfolio of products primarily to grow in the international market. In order to effectively make company's presence felt internationally, they are continuously improving with respect to quality system standards, safety standards and technology up- gradation.

Navin Fluorine, being a part of Arvind Mafatlal Group of company, always cares for its employees including their personal safety. Also constant efforts are on to existing technology to be move environment friendly to enable to be world class internationally in its chosen market. Navin fluorine is—a company where employees have plenty of opportunity to prove themselves and make a definite difference.

RESEARCH OBJECTIVES

The major objective of this work is to evaluate suppliers and suggest some fundamental changes in supplier selection process of Navin Fluorine International Ltd. The second main objective is to examine the scope for improvement in the plant layout.

Some more specific objectives are:

1. Study of quality management system in Navin Fluorine International Ltd.
2. Study of company's documentation process.
3. Study of company's purchasing policy.
4. Recognize in which criteria the company focuses.
5. Study of supplier evaluation processes used by the company.

SUPPLY CHAIN MANAGEMENT

Supply Chain

Supply Chain is define as a network of connected and interdependent organizations mutually and co-operatively working together to control, manage and improve the flow of materials and information from suppliers to end users.

A supply chain consists of all parties involved, directly or indirectly, in fulfilling customer request. The supply chain not only

Figure 1: Framework of Supplier Evaluation Process

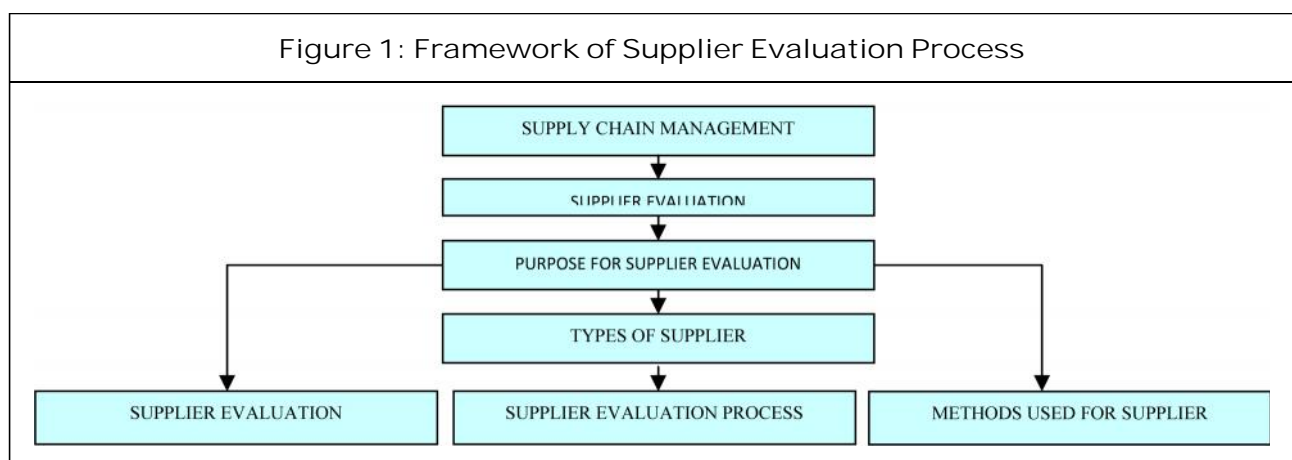
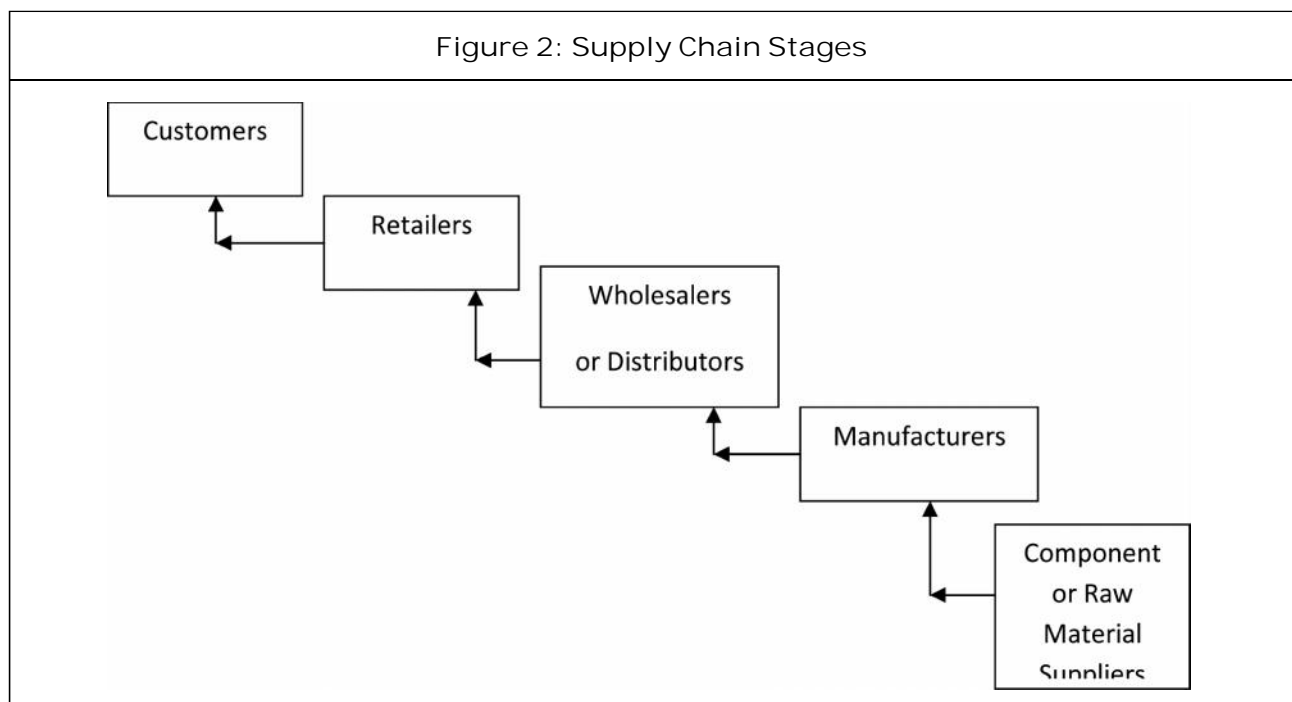


Figure 2: Supply Chain Stages



includes the manufacture and suppliers, but also transporters, warehouses, retailers, and customers themselves. Within each organization, such as manufacturer, the supply chain includes all functions involved in receiving and filling a customer request. These functions include, but are not limited to, new product development, marketing, operations, distribution, finance, and customer service. The customer is an integral part of the supply chain. The primary purpose for the existence of any supply chain is to satisfy customer needs, in the process generating profits for itself.

Supplier Evaluation

Supplier Evaluation is the process of finding the suppliers being able to provide the buyer with the right quality products and services at the right price, at the right quantity and at the right time.

Supplier Evaluation is a critical part of supply chain management. In order to compete effectively in the world market, a company must have a network of competent suppliers. Supplier assessment and evaluation is designed to create and maintain such a network and to improve various supplier capabilities that are necessary for the buying organization to meet its increasing competitive challenges. A firm's ability to produce a quality product at a reasonable cost and in a timely manner is heavily influenced by its suppliers' capabilities, and supplier performance is considered one of the determining factors for the company's success.

Purpose for Supplier Evaluation

Today consumers demand cheaper, high quality products, on-time delivery and excellent

after-sale services. Hence companies are under intense pressure to cut product and material costs while maintaining a high level of quality and after sale service. Therefore an efficient supplier selection process needs to be for successful supply chain management.

Types of Supplier

Suppliers are essential to any business, and the process of identifying and evaluating suppliers is both relevant and important. Sometimes suppliers will contact the purchasing organization through their sales representatives, but more often, the buyer will need to locate them themselves either at trade shows, wholesale showrooms and conventions, or through buyers directories, industry contacts, the Business-to-Business Yellow Pages and trade journals. To understand better this approach, it is significant to present that suppliers can be divided into four general categories: manufacturers, distributors, independent craftspeople and importation sources.

The first category is the manufacturers in which most retailers buy through company salespeople or independent representatives who handle the wares of several different companies. Prices from these sources are usually lowest, unless the retailer's location makes shipping freight costly.

The second type of suppliers are the distributors who also are known as wholesalers, brokers or jobbers, distributors buy in quantity from several manufacturers and warehouse the goods for sale to retailers. Although their prices are higher than a manufacturer's, they can supply retailers with small orders from a variety of manufacturers.

A lower freight bill and quick delivery time from a nearby distributor often compensates for the higher per-item cost.

Another kind is the independent craftspeople that are exclusive distributors of unique creations frequently offered by these independent craftspeople, who sell through representatives or at trade shows.

The last category of suppliers is the importation sources in which many retailers buy

foreign goods from a domestic importer, who operates much like a domestic wholesaler. Or, depending on the company's familiarity with overseas sources, it may want to travel abroad to buy goods.

SUPPLIER EVALUATION CRITERIA

The main six operational criteria for supplier evaluation of manufacturing firm in supply chain management are as follows:

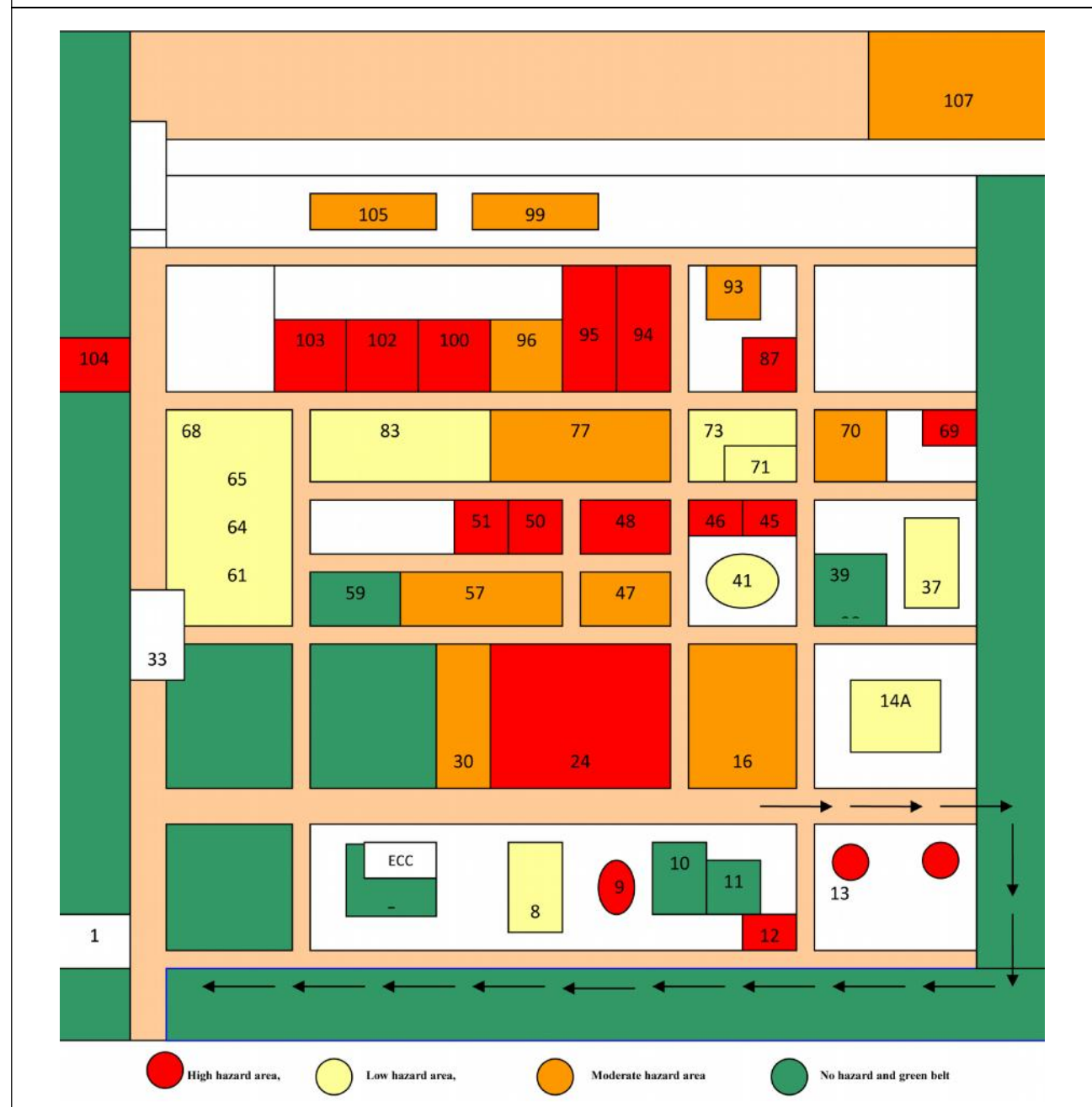
Table 1: Activities, Cost Drivers and Costs Caused by Poor Performances of Supplier			
Performance Criteria		Activity/Cost driver	Costs Caused by poor performance
Quality problem		-Return or rework -Rescheduling or planning -Reordering -Repackaging -Re-receiving -Additional inspection -Production stopping -Disposing of scrap	-Cost of carrying excess inventory due to their unreliability -Cost of train supplier in quality methods -Lost sales
Delivery	Late	-Follow-up or expediting activity -Rescheduling or planning -Premium transportation -Production stopping	-Lost sales -Cost of carrying extra inventory
	Early	-Holding & administrative activity	-Inventory holding cost
Quantity problem		-Additional reception -Additional setup -Rescheduling or planning -Additional inspection -Reordering	-Lost sales
Service and communication problem		-Information exchangeability	-Cost of delays due to slow response to problem

1. Cost
2. Delivery performance
3. Quality
4. Service
5. Flexibility

Some Activities, Cost Drivers and Other Costs Caused by Poor Performance of Supplier

In this section we analyze activities, cost drivers, and other costs caused by the poor performance of supplier for the above criteria. For example, a delivered part that does not

Figure 3: Plant Layout



conform to quality standards causes a production stop, return or rework and so on. The inferior part used should be replaced by the supplier when delivering the next order. The results of this analysis are given in table.

Problems Pertaining to Plant Layout

During the study, discussions were held with plant engineers to know their problems related

to plant layout. A major point was highlighted by most of the engineers regarding the availability of spare parts during emergency in odd hours. These problems were analyzed and the reason appears to be existing location of the spare parts store, which is far away from main plant. In view of this efforts were made to find out a suitable location for spare parts store near the main plant. Hence Force Field

Table 2: Index

Numbers	Places	Numbers	Places
1	Security Office	61	MCC Fire hydrant Pump
5	Administration Office	64	D.G. Set 1
	*Emergency Control Centre	65	D.G. Set 2
8	Finished Product	68	Diesel Tank
9	Methanol Storage	69	Gas Cylinder Storage
10	Effluent Collection Point	70	BSR-2
11	Effluent Collection Point	71	Control Room
12	Storage of Benzene and toluene	73	Utility SCP
	Ethanol Storage	77	Utility DIP 1
13	Proposed Secured land fill	83	R&D Pilot Plant
14	Interm. Storage for DMA	84	Pyrazinamide Plant
16	Main Plant	87	Bromine recovery Plant
24	Interm. Storage for DMA	93	Inerators
30	Raw Material Storage Shed	94	DIP Plant
33	D M Water Plant	95	DIP Plant
37	Water Reservoir for Process	96	Salt Bath Unit
38	Fire Hydrant pumps	99	Inter Medical
39	Water Reservoir for Process		Storage Tank for DIP
41	SCP Plant	100	Fluorination Plant
45	EBA Plant	102	Nitration Plant
46	Furnace Oil Storage	103	Deamination Plant
47	Pilot Plant	104	Hydrogenation Plant
48	2 KT/ PTAC Plant	105	Tank Farm
50	DIP – Plant	107	ETP
51	Utility		
57	Engg.Office, Store, Learning Centre		

Analysis is being done to solve the problem pertaining to stores location.

QUALITY MANAGEMENT SYSTEM IN NFIL

The Quality Management System of Navin Fluorine International Ltd. is established, documented, implemented and maintained. Its effectiveness is continually improved to ensure that the product conforms to the specified requirements and system complies with requirements of this ISO: 9001:2000.

The Quality Management System (QMS) in the company has been developed in the accordance with ISO: 9001:2000 international standards.

The organization has identified processes needed for Quality Management System and application throughout the organization. The sequence of processes is depicted by a flow diagram and the arrows show their interaction. It is given below:

Processes are as follows:

1. Marketing (export/domestic) process
2. Sales process
3. Purchase process (PUR)
4. Stores process (SR)
5. Production process
6. Quality assurance and management representation process
7. Calibration process (CALB)
8. Maintenance process (MTN)
9. Training process (TRG)
10. Production process

Problems Pertaining to Existing Purchasing Process of NFIL

After studying the existing purchasing process of NFIL, following drawbacks are observed:

1. Existing purchasing process involves lot of documentation for each purchase.

Figure 4: Product Realization Process

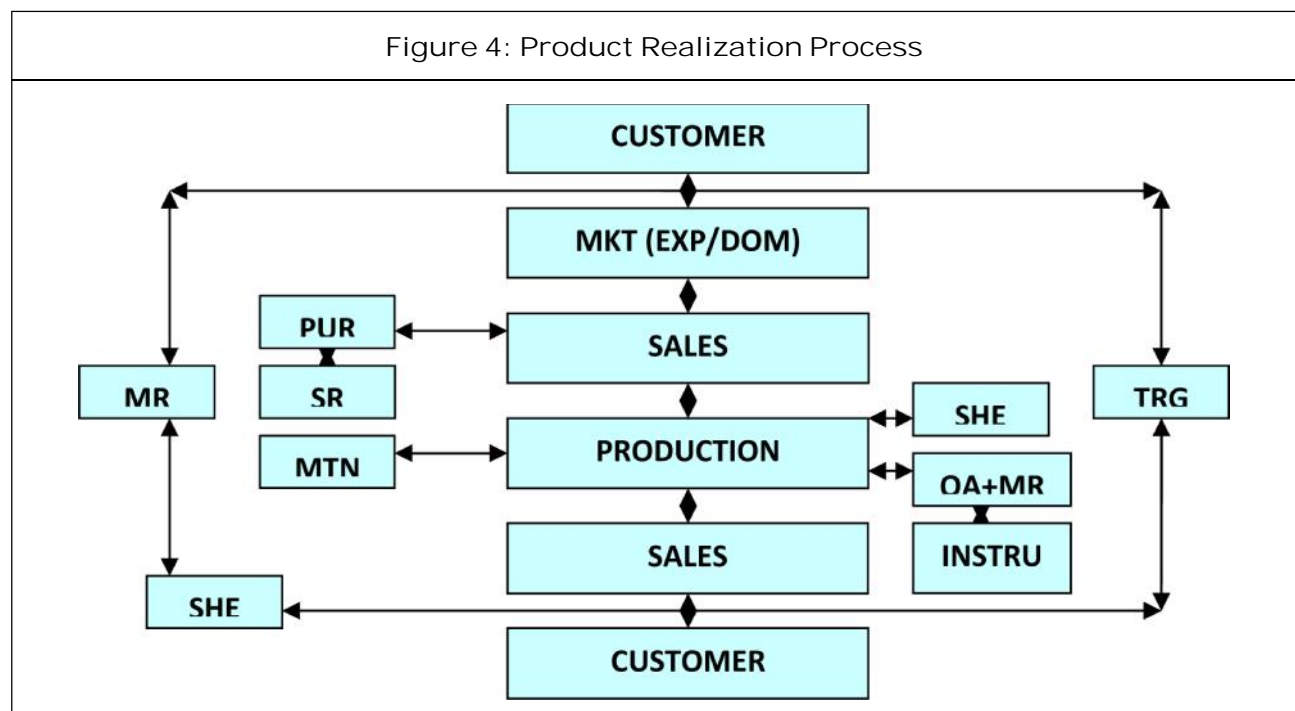
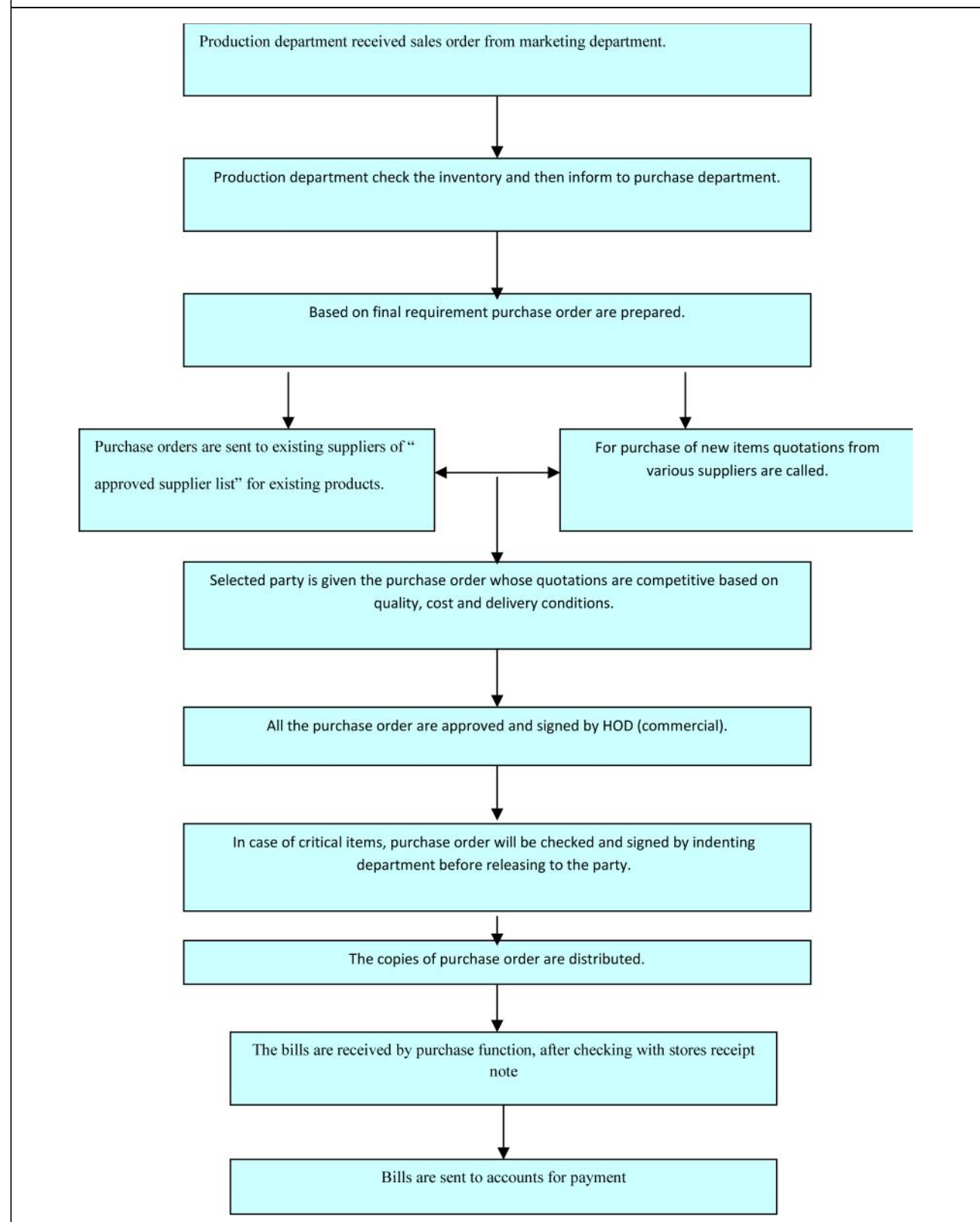


Figure 5: Purchasing Process of NFIL



2. Existing process of purchasing is time consuming.

Suggestions to Overcome Drawbacks Related to Purchasing Process of NFIL

One of the important suggestions to overcome the problem of purchasing process of NFIL is to adopt the Annual Rate Contract (ARC) system.

In this system rates for all the items are obtained in the beginning of the year from all the approved suppliers and rate are approved after negotiations. These rates are applicable for a period of one year. Now each time, when requirement of materials from various department, purchase department will simply send a purchase order showing the quantity required and delivery period.

Some advantages of Annual Rate Contract (ARC) system are as follows:

1. In Annual Rate Contract (ARC) repetition of documentation for each purchase can be avoided.
2. Since documentation part is done once a year only. Repetition of processes can be avoided for each purchase.
3. By adopting Annual Rate Contract (ARC) system time lag between receiving requirements from departments and placing order is saved.

EVALUATION, APPROVAL AND RE-EVALUATION PROCESS OF SUPPLIERS IN NFIL

For Existing Suppliers

1. The existing suppliers of critical raw

material are selected and approved based on following information:

- a. Past satisfactory experience of supplying such materials to NFIL and others.
 - b. Their financial positions and market reputation.
 - c. Whether supplying to any ISO certified company.
 - d. Price.
 - e. Quality.
 - f. Delivery condition.
2. If the information mentioned in (1) is satisfying, then the existing supplier is selected and approved. The supplier is registered in the approved supplier list for the materials they are supplying and records are maintained.
 3. The re-evaluation of existing suppliers is carried out as per the SUPPLIER RATING SYSTEM and records are maintained.

For New Suppliers

1. If the information of new supplier for critical items is received and entered in the selection and approval format either by collecting information or by visiting him.
2. If the information is found satisfactory then the purchase authority selects supplier.

Approval of New Suppliers

1. The selected supplier is given a purchase order for supplying a trial sample or trial lot, the trial lot size is decided based on the need and type of material.

If the trial sample or trial lot conforms to the specifications as analyzed/inspected by Quality Assurance, then the supplier is

registered in approved supplier list for that item.

SUPPLIER RATING SYSTEM

Steps in Supplier Rating

1. The suppliers of critical raw material, stores and spares are enlisted in the approved supplier list after their selection and approval.
2. Approved supplier are re-evaluated periodically once in six months by SUPPLIER RATING SYSTEM for critical items only, as they are critical and the quality of material supplies by them has a maximum bearing on quality of final product.
3. Based on their rating, suppliers are continued or deleted from supplier list.
4. Records of approved suppliers in the form of approved supplier list and supplier rating are maintained.

Suppliers Rating Factors

For Quality (V.Q.)

The material supplied by the vendor is gauged for quality as per the following formula:

$$\text{Quality performance} = \frac{\text{No. of first time passes}}{\text{Total No. of receipt}} \times 100$$

It is mentioned in % terms.

For Delivery (V.D.)

The suppliers are rated for Delivery based on the following formula:

$$\text{Delivery performance} = \frac{\text{Receipt received on time}}{\text{Total No. of receipt}} \times 100$$

It is mentioned in % terms.

Overall Performance

Suppliers are rated for their overall performance based on the combined Quality Performance as well as Delivery Performance of a given period of time for any particular material with 0.75 weightage for Quality and 0.25 for Delivery.

$$\text{Overall Performance} = 0.75 \text{ V.Q.} + 0.25 \text{ V.D.}$$

FORCE FIELD ANALYSIS

Force Field Analysis is a simple but powerful technique for building an understanding of the forces that will drive and resist a proposed change. Forces that help you achieve the change are called “driving forces.” Forces that work against the change are called “restraining forces.” By carrying out the analysis we can plan to strengthen the forces supporting a decision, and reduce the impact of opposition to it. It consists of a two-column form, with driving forces listed in the first column, and restraining forces in the second.

By applying Force Field Analysis, it can be observed that the rating of “Driving Force” is higher than the rating of “Restraining Force”. Hence the proposal related to relocation of store can be implemented.

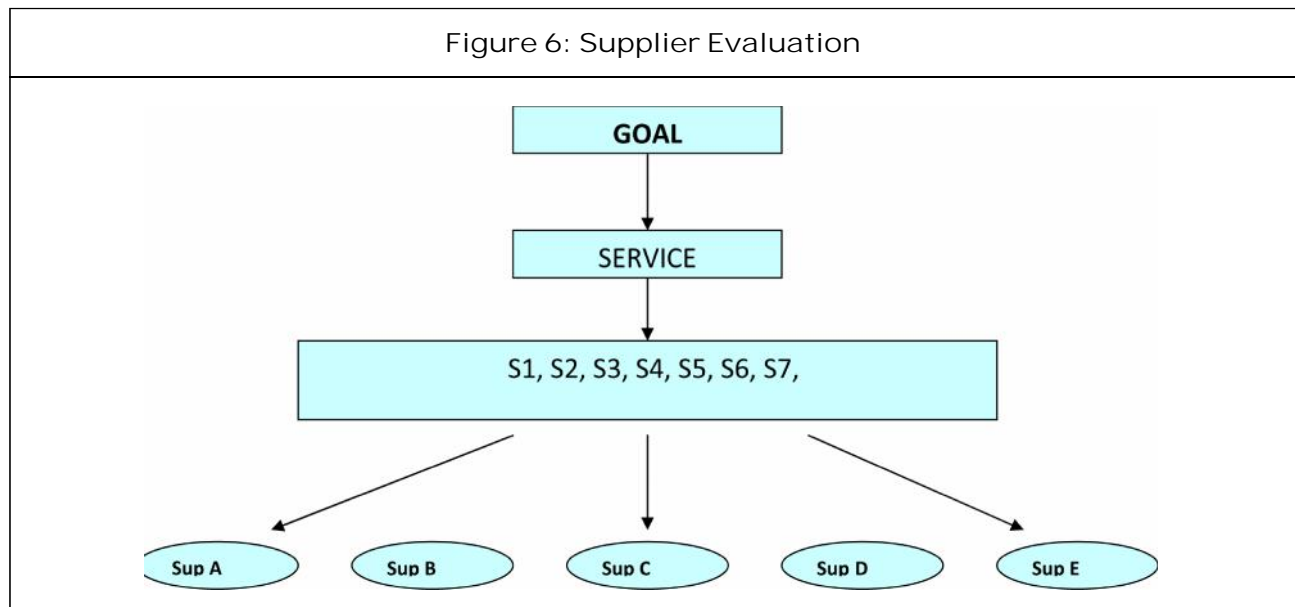
SUPPLIER EVALUATION BY SIMPLE RATING METHOD

1. Main Objective: To evaluate critical item supplier.
2. Primary Selection Criteria:
 - a. Service
3. Sub Criteria:

For Service:

 - a. S1-Flexibility
 - b. S2-Reliability

Figure 6: Supplier Evaluation



c. S3-Competence

d. S4-Responsiveness

e. S5-Access

f. S6-Courtesy

g. S7-Communication

h. S8-Creditability

i. S9-Security

j. S10-Spare parts availability

k. S11-After sales service

l. S12-Guarantee

m. S13-Price negotiation

n. S14-Quantity variation

o. S15-Business relationship

4. Alternatives:

a. Sup A-Supplier A

b. Sup B-Supplier B

c. Sup C-Supplier C

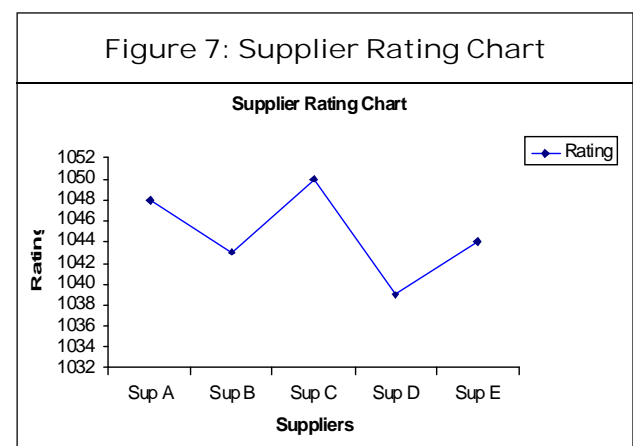
d. Sup D-Supplier D

e. Sup E-Supplier E

Summary of Points Given by Company's Officers to Each Supplier

When the number of suppliers and their ratings are plotted on a graph the results can be obtained as indicated in the graph given below:

Figure 7: Supplier Rating Chart



CONCLUSION

The supplier evaluation processes are very important to organizations nowadays since choosing the one that fits best the company's needs, can bring significant savings. These processes can vary across companies depending on many factors. One of these factors is the focus criteria of the company that

depends on its competitive market. These criteria may vary from quality, cost/price, delivery, financial capability and stability, supplier management capability, overall personnel capabilities, process and technological capability, environmental regulation compliance, supplier purchasing strategies, policies and techniques, among others.

This indicates that the supplier performance measurement criteria most commonly used by manufacturing and chemical industries are quality, delivery and service.

This includes the supplier evaluation process, criteria used for supplier evaluation, create a supplier evaluation survey with the right questions and model the supplier evaluation survey as a management tool. This project also focuses its attention to examine the scope for improvement in the plant layout.

This work presents an evaluation process of supplier selection in Navin Fluorine International Ltd. using a simple rating method. This project also focuses the quality management system, documentation process, and purchasing process of Navin Fluorine International Ltd. ●

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