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## A REVIEW OF DISTRIBUTION RELATED PROBLEMS IN SUPPLY CHAIN MANAGEMENT OF A SHIP MANAGEMENT COMPANY

Sandesh Narayan Arondekar  
Grad. IE (G-34773)

### Abstract

*To review and resolve the distribution related problems in the ship management company using problem solving tools and techniques. It is decided to concentrate to solve the problems in the area of procurement, transportation, inventory control and customer service. Systematic literature reviews is based on more than 13 research papers from at least 07 international journals and 6 books from respective field expert. The review covers various dimensions of supply chain and tools and techniques which can be applied to resolve the distribution related problems. It is observed that to improve the distribution related problem very few problem solving tools and techniques were used till dates. The techniques used found very effective and simple in implementation. The author is of the opinion that use of these techniques to solve the supply chain management problems shall be increased. The problem solving tools and techniques were used in manufacturing industry in large scale than in non-manufacturing industry. Hence actual use of problem solving tools and techniques in supply chain management field was found limited. The methodological review will provide increased understanding of the current state of research in the use of problem solving tools and techniques in supply chain management area. This will also elaborates the importance of use of these tools and techniques in non-manufacturing industry. The tools and techniques reviewed will be used in "Goodwood ship Management Company" to resolve the problems.*

**Keywords:** Literature, Problem solving tools, Research, Supply chain management

### 1. INTRODUCTION

Goodwood Ship Management is an independent ship management company that offers a comprehensive range of high quality marine services. At Goodwood Ship Management, they provide a broad spectrum of Ship Management services which covers Technical Management, Crew Management, Commercial Management and Marine Consultancy Services which includes New Building Supervision. Currently they manage a diversified fleet, consisting of VLCCs, Suezmaxes, Aframax, Chemical tankers, Bulkers and Container vessels. The major drivers of the Supply chain management are Production, Inventory, Location, Transportation and information. The main participants of the supply chain management are Supplier, Manufacturer, Distributor, Retailer and Shopper. The five basic components of supply chain management are Plan, Develop (Source), Make, Deliver and Return. [18] Role of inventory management, role of Information Technology are very important in managing the Supply Chain. During the distribution of various services and related equipment and accessories to different containers it was observed that the problem faced by different department was raised by considerable amount in last consecutive 3 years than that of acceptable limit. After collecting the last 8 years data in different departments the problems which were not able to solved in time was found more in the following department of the company: procurement, transportation, inventory control and customer service. It was decided to use the problem solving tools and techniques to attain the vital few problems in the department. This paper contributes in elaborating various aspects of supply chain management and problem solving tools and techniques related to any service industry like Goodwood

Ship Management Company. The paper further explains different tools and techniques that can be successfully used in non-manufacturing industry without any hindrances.

### 2. TYPICAL PROBLEM FACED IN SCM

The problems in the area of procurement, transportation, inventory control and customer service of Goodwood Ship management Company are listed by referring the old database. From that overall list following problems are affecting (directly or indirectly) the distribution of various items/services to vessels:

- High Inventories
- Poor Forecast Accuracy
- Suppliers are unreliable
- Products are purchased or manufactured in larger quantities for economy of scale
- Customer orders are released for manufacturing earlier than needed
- Frequent Stock Outs
- Lead times are long
- Inaccurate sales / demand forecast
- Regular expediting
- Frequent changes in product requirement
- High cost throughout supply chain

### 3. PROBLEM SOLVING TECHNIQUES

The knowledge about methods and techniques of quality management together with their effective use can be definitely regarded as an indication of high organizational culture.

Using such methods and techniques in an effective way can be attributed to certain level of maturity, as far as the quality management system of an organization is concerned. [2] these techniques are developed for particular type of the problem. If we have similar problem then we can straight away go for that type of problem solving technique. Some of the problems solving techniques are listed below:

#### a. Eight Disciplines (8Ds) Problem Solving

8D method was popularized by Ford Motor Company in automotive sector. This methodology helps to identify and correct causes of nonconformance. This methodology can be applied in case of major nonconformance, field complaints, and repeated quality issues where the team based approach is needed. [15] The 8D Method presents considerable advantages to attack the root cause of the problem. [1]

#### b. Grow Model

The Grow Model (or process) is a simple method for goal setting and problem solving. It was developed in the United Kingdom and was used extensively in corporate coaching in the late 1980s and 1990s. G represents Goal, R – Reality, O – Obstacles & Options and W – Way Forward. This is very simple to implement, many researchers chose the GROW model for the study. [7]

#### c. Ooda Loop

The phrase OODA loop refers to the decision cycle of observe, orient, decide, and act, developed by military strategist and USAF Colonel John Boyd. Boyd applied the concept to the combat operations process, often at the strategic level in military operations. [6]

#### d. 12 Step Problem Solving Method

It is detailed method of problem solving which give emphasis to each activity in detail. In this method groups of working level people from different areas related to problem are involved resulting in workable solution. [3] [4] [5] The 12 steps are as follows:

- |                                    |   |
|------------------------------------|---|
| i. Identification of Problem       | ii. Selection of Problem                      |
| iii. Definition of the Problem     | iv. Analysis of the Problem                   |
| v. Identification of causes        | vi. Finding out the root cause                |
| vii. Data Analysis                 | viii. Developing Solution                     |
| ix. Foreseeing Probable Resistance | x. Trail Implementation and check performance |
| xi. Regular Implementation         | xii. Follow up and Review                     |

### A3 PROBLEM SOLVING

A3 is a structured problem solving and continuous improvement approach, first employed at Toyota and typically used by lean manufacturing practitioners. Worksheet size is ISO A<sup>3</sup> size. A<sup>3</sup> is simple and strict approach systematically leading towards problem solving over structured approach. A<sup>3</sup> leads towards problem solving over the structure, placed

on the ISO - ISO A3 single sheet paper. This is where the process got its name. A<sup>3</sup> is also called as SPS which stands for «Systematic Problem Solving». A<sup>3</sup> is based on the principles of Deming's PDCA (Plan-Do-Check-Act).

### 4. PROBLEM SOLVING TOOLS

Problem solving tools are determined by the requirements of the problem and the amount of time to solve the problem. The use of selected tools is explained below.

#### a. Scatter Diagram (Co-Relation)

A correlation is a statistical technique, degree and an index of the relationship strength between any two or more quantities (variables) in which they vary together over a period and it shows whether and how strongly pairs of variables are related. Possible correlations range from +1 to -1. It does not prove or disprove any cause-and-effect (causal) relationships between them. When solving a problem or analyzing a situation one needs to know the relationship between two variables. A relationship may or may not exist between two variables. If a relationship exists, it may be positive or negative; it may be strong or weak and may be simple or complex. A tool to study the relationship between two variables is known as Scatter Diagram. It consists of plotting a series of points representing several observations on a graph in which one variable is on X-axis and the other variable in on Y-axis. If more than one set of values are identical, requiring more points at the same spot, a small circle is drawn around the original dot to indicate second point with the same values. The way the points lie scattered in the quadrant gives a good indication of the relationship between the two variables. [13]

#### b. 5 Whys

The 5 Why's is a simple problem-solving technique that helps you to get to the root of a problem quickly. The technique was originally developed by Sakichi Toyoda, a Japanese inventor and industrialist. It is a method of questioning that leads to the identification of the root cause(s) of a problem. A why-why is conducted to identify solutions to a problem that address it's root cause(s), rather than taking actions that are merely band-aids, a why-why helps to identify how to really prevent the issue from happening again. It is used when problem involve human factors or interactions and / or in day to day business life. [12]

#### c. Brainstorming

Conventional Problem solving is an activity which is not very welcomed by the team members as confident and out spoken participants may drown out and intimidate quieter group members. Less confident and quieter group members may not share their ideas freely and in short group problem solving is often ineffective and sterile. By contrast, brainstorming provides a freewheeling environment in which everyone is encouraged to participate. Quirky ideas are welcomed, and many of the issues of group problem-solving are overcome. All participants are asked to contribute fully and fairly, liberating people to develop a rich array of creative solutions to the problems they're facing. [3] [4] [19]

#### d. Affinity Diagram

The affinity diagram method is a technique that an individual or team can apply for problem solving as well as idea generation and design. It is particularly useful for solving unfamiliar or complex problems. It is similar to the mind mapping technique in that one generates ideas that link up to other ideas to form patterns/chain of related thoughts. This process takes many items, needs or features and sorts them into meaningful groups. It can be applied during the analysis stage of a six sigma improvement process. It can be widely used in the planning stage of a problem to organize the ideas and information. It organizes and categorizes items and provides a good visual of independent variables. [3]

#### e. Pdca (Plan-Do-Check-Act)

PDCA known as Deming Cycle or Deming Wheel, PDCA is a tool for continuous improvement of processes and products. PDCA cycle is used when: As a model for continuous improvement.

- When starting a new improvement project.
- When developing a new or improved design of a process, product or service.
- When defining a repetitive work process.
- When planning data collection and analysis in order to verify and prioritize problems or root causes.
- When implementing any change. [8] [9] [11] [3] [19]

#### f. Cause And Effect Diagram (Fishbone Diagram)

Any defect in a component, a product or service could be due to one or more causes. To find out the relationship between the causes and effect, a diagram is drawn systematically by mapping out all the probable causes influencing the effect. This is called a Cause and Effect Diagram. A Cause and Effect diagram gives a visual representation of factors that might contribute to an observed effect. Here the inter-relationship is generally qualitative and hypothetical. It is normally prepared as a prelude to developing the data needed to establish causation empirically. [8] [9] [10] [12] [19]

#### g. Flow Diagram

Flow Diagram is a graphical or a pictorial way to depict a process. With the help of a flow diagram we can show process sequence. It can be used to dissect a process for better understanding and analyzing. It can also be used for re-planning or making a change. The process may be a manufacturing process of a product (entire or segment), a service provided, to convey some information or a combination of any of them. Flow diagram is a graphical or a pictorial way to depict a process. With the help of a Flow diagram we can show process sequence. It can also be used to dissect a process for better understanding and analysis, for re-planning or making a change. The process may be a manufacturing process of a product in its entirety or a segment of it. A service provided, to convey some information or a combination of any of them. [8] [9] [14] [3]

#### h. Pareto Chart

Pareto Diagram is a technique of arranging data; according to priority or importance and using it into a problem solving framework. This helps to find out the “Vital Few” from the “Useful Many” for problem selection. It is often said that one who makes noise always gets the attention. This is the fact of life”. By this the most important aspect gets neglected. When it comes to problem solving, we cannot go by this perception but have to rely upon data and facts. [8] [9] [12] [3]

#### i. Smart Technique

SMART is a mnemonic acronym, giving criteria to guide in the setting of objectives, for example in project management, employee - performance management and personal development. After the overall goals are outlined, you can develop smart objectives using the following principles:

- Specific: The objective clearly speaks to the single problem that it is intended to address.
- Measurable: This includes benchmarks, or points of reference, that can be used later to compare results. Note: At the objective level, you will not necessarily need to express them as a percentage or number. Instead, you can do this for the indicator related to the objective.
- Appropriate: The objective is related to and clearly supports the goal.
- Realistic: The capacity and resources are available and can be used to reach the objective.
- Time-bound: Objectives are planned over time to ensure that they can be met and are measured within a specific timeframe. Note: In programs with specific time period, such as a five year project, you do not always need to state the time period as it is implied. This is especially true when you are working within a workplan structure. [16]

#### j. Force Field Analysis

Force Field Analysis was developed by Kurt Lewin (1951) and is widely used to inform decision making, particularly in planning and implementing change management programs in organizations. It is a powerful method of gaining a comprehensive overview of the different forces acting on a potential organizational change issue, and for assessing their source and strength. Force field analysis is best carried out in small group of about six to eight people using flipchart paper or overhead transparencies so that everyone can see what is going on. The first step is to agree the area of change to be discussed. This might be written as a desired policy goal or objective. All the forces in support of the change are then listed in a column to the left (driving the change forward), whereas all forces working against the change are listed in a column to the right (holding it back). The driving and restraining forces should be sorted around common themes and then be scored according to their ‘magnitude’, ranging from one (weak) to five (strong). The score may well not balance on either side. Throughout the process, rich discussion, debate and dialogue should emerge. This is an important part of the exercise and



key issues should be allowed time. Findings and ideas may well come up to do with concerns, problems, symptoms and solutions. It is useful to record these and review where there is consensus on an action or a way forward. In policy influencing, the aim is to find ways to reduce the restraining forces and to capitalize on the driving forces. Force field analysis is a technique to visually identify and analyze the forces affecting a problem situation so as to plan a positive change. It has been used in diverse fields ranging from organizational change to self-development. Its visual character, simplicity, suitability for group work and applicability in planning for change, makes it a potential tool. [17]

## 5. CONCLUSION

- The distribution related problems in the area of procurement, transportation, inventory control and customer service of ship management company were listed.
- To solve the problems different problem solving techniques were studied like Eight Discipline Problem Solving, GROW Model, OODA Loop, 12 Step problem Solving and A3 problem Solving. After detailed study of each technique, it is decided to use 12 Step problem solving technique to eliminate the problems in ship management company.
- Some of the important tools which may be part of any problem solving techniques were presented here. The tools to be used in 12 step problem solving technique are Brainstorming, Cause and Effect Diagram, Pareto Chart, PDCA Cycle among others.
- The paper gives the initial idea about the distribution related problems of ship management company, the tools and techniques which can be utilized to resolve these problems. These tools and techniques are being regularly used in manufacturing industry to eliminate/resolve the work related issues.
- Future Work: Author is working in the Goodwood Ship Management Company. He is going to present the case study on resolving the distribution related problems using the problem solving tools and techniques elaborated above. The case study will be part of his Dissertation Work for fulfilling his Master's Degree.

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#### AUTHOR

**Sandesh Narayan Arondekar**, Department of Mechanical Engineering, Viva Institute of Technology , Virar East , Shirgaon, Veer Sawarkar Road, Virar (East), Tal-Vasai, Chandansar, Virar – 401 303 (MS)

Email : sandesh\_ar82@rediffmail.com

