# STRATEGIC EVALUATION OF VENDOR MANAGEMENT THROUGH FUZZY LOGIC CONCEPT

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**Abstract-**In this paper some techniques have generated for the vendor management. There are raw material which should be supplied to the industry and by the industry to the customer as product. This management will be more emphasize to the market environment. To encounter this challenge for establishing the industry vendor management takes into account as a huge problem. In this scenario profit has used to take care of vendor management and fuzzy logic technique has applied in there to measure it. The MATLAB software is used as a tool to evaluate the vendor management.

**Keywords-** Vendor management, Fuzzy rule base action, Fuzzy If-Condition-Then-Action, Cost, Quality, Service

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## INTRODUCTION

Today vendor management play a vital role in selection of material, so impacts for a company are choice of material from source at right time in right place. These are critical condition for an industry. The main concern for the industry is good relationship for vendor based on the 'cost', 'quality' and 'service'. There are some relationship between supplier and buyer so that vendor management can be easily processed. The vendor supply raw material to the industry and industry buy these raw materials for purpose of production. The vendor management can be easily evaluated based on 'cost', 'quality', 'supplied time' and by requirement of 'design of product'. For better production optimum and good quality should be exist in the product. Every industry has a vendor rating system and to evaluate the vendor management we can use the fuzzy logic technique. Based on the profit and service a model has generated, consequently the vagueness of management process will be certain. This model is more tactics to challenge in rival of improved industry. This paper is divided in to five sections. In this scenario the second section is literature review. Section 3 has described by Factors i.e. 'cost', 'quality' and 'service'. Section 4 illustrates the fuzzy rule construction that is subdivided in 4.1 Rule base actions and other is 4.2 If-condition-Then-action. In section 5 results and discussion has described. Finally in section 6 the paper has concluded.

## 2. LITERATURE SERVEY

There are various approaches has generated for vendor management. Many conceptual models have been developed in this field. Faez F. [4] has focused on a case based reasoning approach which is a recently recommended method for solving the vendor selection process by making use of previous similar situations. Choy and Lee [3] introduced a case based management system for decision making in task allocation under a distributed manufacturing environment. Zerbini F. [8] proposes that suppliers release capacity a form of knowledge diffusion that describes the transmission of a sense of a supplier's tacit knowledge to manufacturers-influences their performance during vendor selection. UmaDevi K. [6] proposes an Analytic Hierarchy Process model for selecting the best vendor among the alternatives.it has taken criteria like quality which can be measured by defect rate is considered. Aksoy A. [1] has developed, fuzzy logic system which was constructed to solve multi period dynamic decision making for strategic supplier selection with stochastic demand. Yu Min-Chun [7] investigates a fuzzy multi-objective vendor selection program under lean procurement based on cost minimization; delivery schedule violation minimization.it incorporates the vendor production capacity uncertainty into the model to identify an appropriate selection policy for vendors under practical operating conditions. Lin kuo-ping [5] develops a fuzzy system dynamic to simulate vendor managed inventory, automatic pipeline, inventory and order based production control system. The fuzzy vendor managed inventory model can be easier simulated under uncertain environment. Aliev, R. A. Fazlollahi [2] point out that we are usually faced with uncertain market demands and capacities in production environment.

## 3. FACTOR AFFECTING THE VENDOR MANAGEMENT

There are three potential for evaluation of vendor management. Here the cost, quality and service are main factor affecting in vendor management. If the cost, quality in the production process is optimum then it will be a key element to make a more profit for industry. Third factor is service that depends on the proper time of supplier.so these three factors are explained in following terms.

(1) **Cost** – This cost will be consisting of ordering cost, unit cost and transportation cost.
(2) **Quality** – From the definition of industrial engineering "Quality is satisfaction to customer". It is another factor which depends on the vendor management. A good quality product will consist of reduced waste from raw material. Low quality material can be rejected on duration of production process.
(3) **Service** – The service in vendor management is depending on the proper time of supplied material and on delay time of supplied material. Both are very important factor for vendor management.
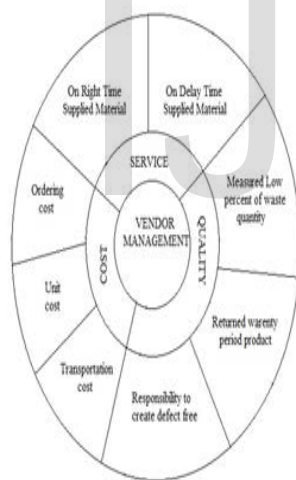
**Figure 1**: Vendor Management

So these are the factors that are component to the vendor management. For the purpose of evaluation we can use fuzzy logic tool. Here the MATLAB has been used for fuzzification.

# 4. FUZZY RULE CONSTRUCTION FOR EVALUATION

The fuzzy logic tools make the decision and generate the output values. The designer can generate output by rule base method. Mainly this process can yield the profit. As we are taking the input as a cost and quality so this input and output can rectify the vendor management. By processing it this profit will be encounter with service in vendor management.

## 4.1 Table for the Rule Base Action on 'cost' and 'Quality'

Cost

| Quality | Neg. High | Neg. Low | Zero | Pos. Low | Pos. High |
|---|---|---|---|---|---|
| Neg. High | Neg. High | Neg. High | Neg. High | Neg. Low | Zero |
| Neg. Low | Neg. High | Neg. High | Neg. High | Zero | Pos. Low |
| Zero | Neg. High | Neg. Low | Zero | Pos. Low | Pos. High |
| Pos. Low | Neg. Low | Zero | Pos. Low | Pos. High | Pos. High |
| Pos. High | Zero | Pos. Low | Pos. High | Pos. High | Pos. High |
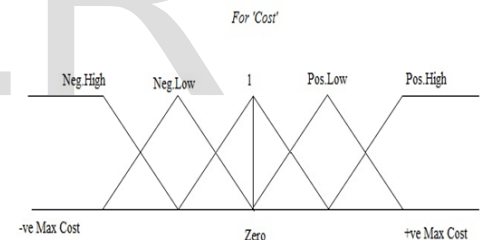
**Figure2:** Fuzzy Rule Base for 'Cost'
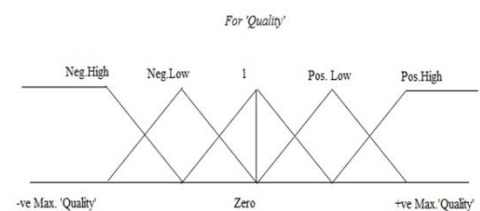
**Figure 3**: Fuzzy Rule Base for 'Quality'

From the above diagram we get the idea that-

A. If cost is zero and Quality is zero then profit is zero
B. If cost is zero and Quality is positive low then profit is positive low.
C. If cost is positive low and Quality is positive low then profit is positive high.

D. If cost is positive low and Quality is positive high then profit is positive high.

## 4.2 Table for If –Condition-Then –Action for 'Service'

These Action rule has been created for service of the supplier whether it should be accepted or rejected. From section 4.1 the profit has evaluated based on 'cost' and 'quality'. This profit parameter will decide the services are cheap or good. The overall ratings are based on this action. As the 'Service' is vital for the vendor management so following can be decided by given process



**Figure 3**: fuzzy membership for 'cost'
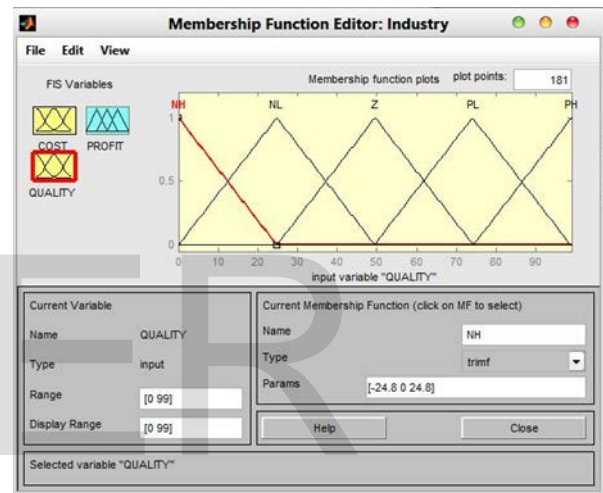


**Figure 4**: fuzzy membership for 'Quality'

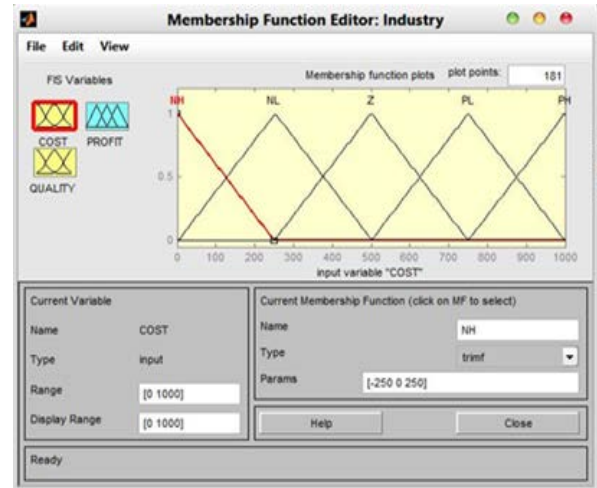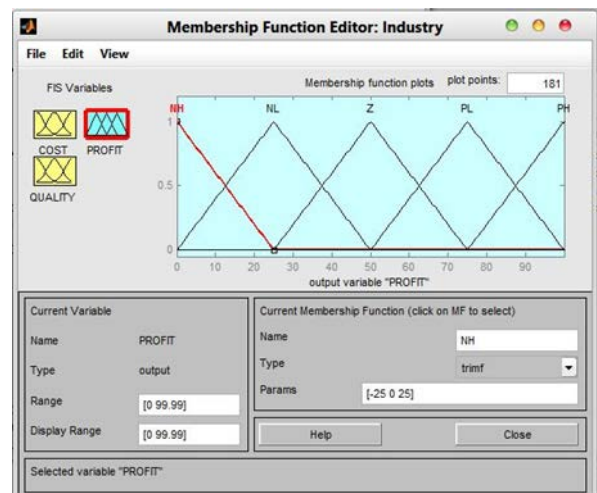|  | CONDITION | |
|---|---|---|
| If "Profit" by Production | Service is Cheap (By Delay Time) | Service is Good (On Right Time) |
| Zero | Reject | Under Consideration |
| Positive low | Reject | Acceptable |
| Positive High | Under Considerable | Acceptable |



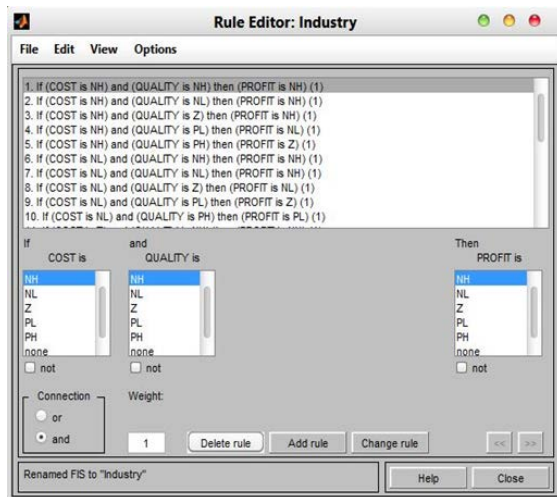**Figure 5**: Fuzzy membership output for 'profit'

Figure 6: fuzzy Rule base editor for Industry

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## 5. RESULTS AND DISCUSSION

With the help of MATLAB software "profit" can be calculated. For calculating it "cost" and "Quality" will be used for input. Then "profit" will be resulted by the rule base action editor.so for vendor management decision can be obtain by if-condition-then –action. This concept was used in a joint automobile industry located in Jamshedpur for supply of axle from small scale industrial. A saving of 5.3% in the cost is established.

## CONCLUSION

The vendor management process is crucial tool for an industry which is based on the supplier and buyer. Consequently this model deals with no shortage of production process for the designer. This study proposed a model which results in control of the production process. These algorithms do not hinder the production process during application. The model generates the idea of "service" on the basis of "cost" and "Quality". It plays a great role in decision for vendor management and ultimately saving the precious time. In this study an algorithm is generated in MATLAB through fuzzy logic rule based action.

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