



## A Case Study for Selection of suitable Vendor Management using the Fuzzy Logic Technique

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**ABSTRACT:** In this study a few strategies have been produced for the proper execution of vendor management. This management will be more emphasize to the market condition. To encounter this challenge for the establishment of various company vendor management considers as an immense issue. Now a day's fuzzy logic technique has been implemented for appropriate manufacturing choices. The present study discusses the use of fuzzy logic for the minimization of the major losses in the organization. We have used the rule-base of the fuzzy logic approach. Using this technique such expressions that are difficult to analyze are quantified and used for making a decision. Furthermore, MATLAB programming is utilized as a mathematical tool to examine vendor management.

**Key words:** Vendor Management, Fuzzy logic and Manufacturing.

### I. INTRODUCTION

Today vendor management assumes an indispensable job in the determination of material, so impacts for an organization are the decision of material from the source at an opportune time in the ideal spot. These are the basic conditions for the industry. Lin *et al.*, (2010) gives a fuzzy framework dynamic to reproduce vendor manage stock, programmed pipeline, stock and request based creation control framework [1]. The fuzzy vendor manage stock model can be simpler under uncertain condition. The primary concern for the manufacturing industry is a decent relationship for vendor's dependent on the 'cost', 'quality' and 'administration'. Yu *et al.*, (2012) explores a fuzzy multi-target vendor selection choice program under lean acquisition dependent on cost minimization; conveyance plan infringement minimization. It fuses the vendor creation limit vulnerability into the model to distinguish a fitting determination approach for vendor under pragmatic working conditions [2]. Faez *et al.*, (2009) has concentrated on a case based thinking approach which is prescribed as a good strategy for the vendor choice procedure by utilizing past comparable circumstances [3]. There is some connection among providers and purchasers with the goal that vendor management can be effectively-prepared. The vendor supplies raw material to the business and industry purchase these raw materials for the reason for production. The vendor management can be easily dependent on 'cost', 'quality', 'provided time' and by the prerequisite of 'plan of item'. For better creation, ideal and great quality should exist in the item. Fuzzy logic is an investigation technique intentionally formed to consolidate vulnerability into a choice model [4]. Each industry has a vendor rating framework and to assess the vendor management we can utilize the fuzzy logic method. In view of the benefit and administration, a model has produced, consequently the unclearness of the executives'

procedure will be sure. This model is more strategies to challenge in adversary of improved industry. There are critical advantages of applying fuzzy tool. Fuzzy logic gives an improved a stage where the advancement and investigation of models require decreased improvement time than different methodologies [5]. Utilizing fuzzy is an exceptionally applicable issue in a creation condition where the need for maintenance resources management is significant where the requirement for upkeep assets for maintenances management is noteworthy. Basically maintenance can be arranged into two principal types: corrective and preventive [6-7]. One way to deal with the advancement and maintenance of huge principle-based systems has been the utilization of inductive demonstrating methods to analyze huge databases and create a Knowledge-based system [8-11]. AHP has a few focal points, remembering its acknowledgment of irregularities for administrative decisions/observations and its ease of use in light of the fact that clients may legitimately enter judgment information straightforwardly without the necessity of numerical information. It likewise permits clients to structure complex issues as a pecking order or a set of incorporated levels. One of the principal points of interest in this technique is the relative simplicity with which it handles numerous criteria. Furthermore, to this, Fuzzy logic is more obvious and it can successfully deal with both subjective and quantitative information.

### II. METHODOLOGY

#### A. Vendor management Rule

There are three potentials for assessment of vendor management. Here the cost or price, quality, and administration are the primary factor influencing vendor management. In the manufacturing process the cost, quality in the creation procedure is ideal then it will be a key component to make progressively productive for the business. The third factor is an administration that relies upon the best possible time of provider.



Fig. 1. Vendor Management.

### B. Fuzzy Logic Rule

Fuzzy logic rule has been developed in MATLAB in the form of IF-CONDITION-THEN-action-rules. These rule shows how efficiently we can choose vendor. We have taken input parameter of Price, Quality, and Service and output parameter as best choice of supplier. Example of rule

- IF price is Less and Quality is poor and Service is Cheap THEN vendor selection is Rejected.
- IF price is Medium and Quality is Good and Service is good THEN vendor is Accepted.

Similarly, there will be different set of fuzzy rules. For Example, weightage of Price Input (16) medium, Quality Input 20(acceptable), and service input 42 (optimum) Then Output data is 8, which means weightage of vendor selection is 8 (Under considerable). We have shown it in rule viewer Fig. 5.

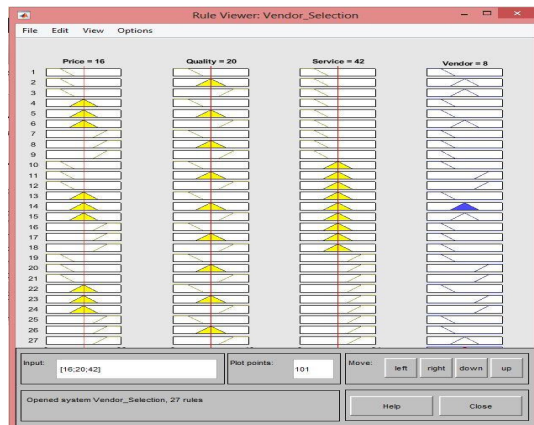


Fig. 2. Rules viewer for the membership function.

### III. RESULT AND DISCUSSION

**Case study on Vendor Selection:** The major challenges faced by manager is for selection of vendor. There is complexity involve in considering supplier performance and relation factors. So in competitive market a dynamic model is introduced. In our case study we have taken three different company. We have found drastic improvement in manpower, cost reduction and time reduction by applying fuzzy logic approach for vendor selection has shown in Fig. 4-5.

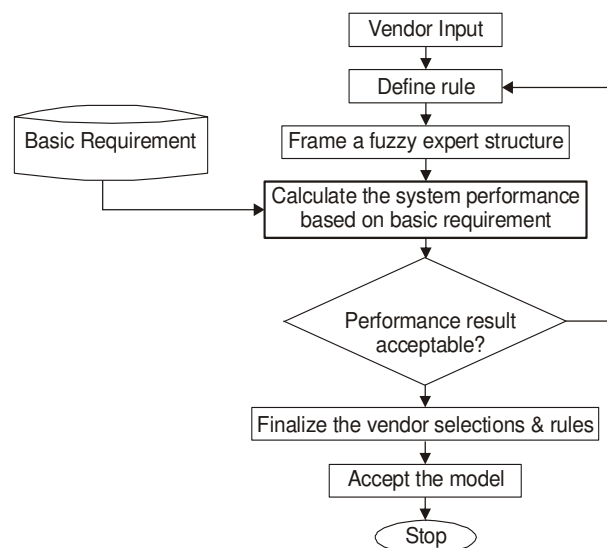


Fig. 3. Process steps for fuzzy rule.

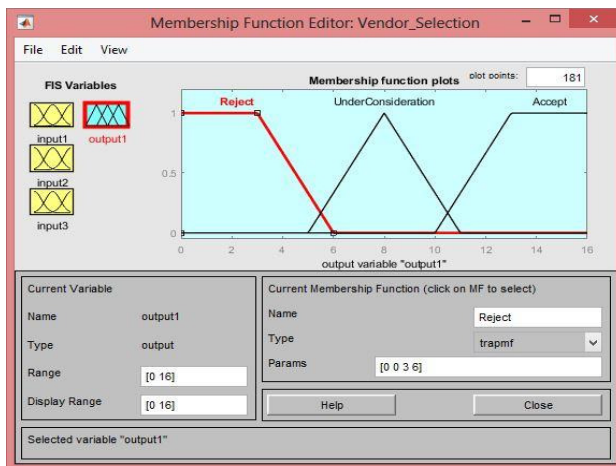


Fig. 4. Membership function for supplier.

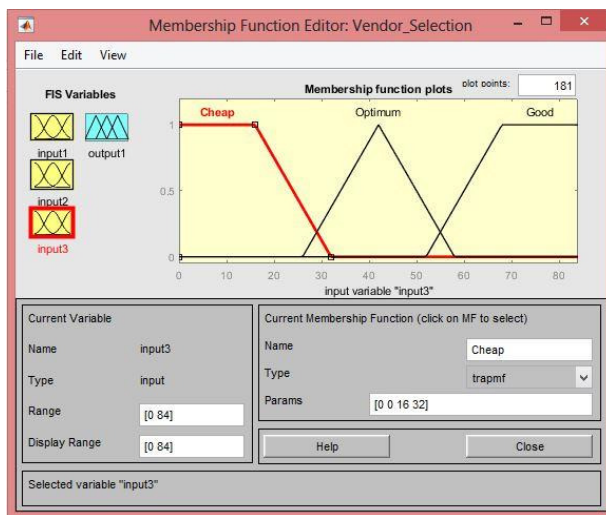


Fig. 5. Membership function for supplier.

**Fuzzification for Supplier:** Effective supply chain increases organizational effectiveness and leads to improved customer value, better resources utilization and improved revenue. Supply chain is supplier evaluation and selection process, which can also include an importer who supplies an item of plant, machinery or equipment.

– **Manpower Reduction:** -Before fuzzy logic approach the manpower for making decision in company 'P', 'Q', and 'R' were 15, 16 and 14 respectively. But after using Fuzzy model manpower in decision was reduced to 11, 10 and 9 respectively which is shown in Fig. 6.

– **Cost Reduction:** - Before fuzzy model approach the cost for taking decision in company 'P', 'Q' and 'R' was 3.6 lakh, 4.2 lakh, and 2.8 lakh respectively. But after using fuzzy logic approach Fig. 7 shows that cost in making decision was reduced to 3.1 lakh, 3.6 lakh and 2.2 lakh respectively.

– **Time Reduction:** - Before fuzzy model the time for selecting vendor in company 'P', 'Q' and 'R' was 9 days, 10 days and 8 days respectively. But after applying fuzzy model time was reduced to 5 days, 4 days and 3 days respectively which is shown in Fig. 8.

We have shown all these changes in selection of vendor by following graphs.

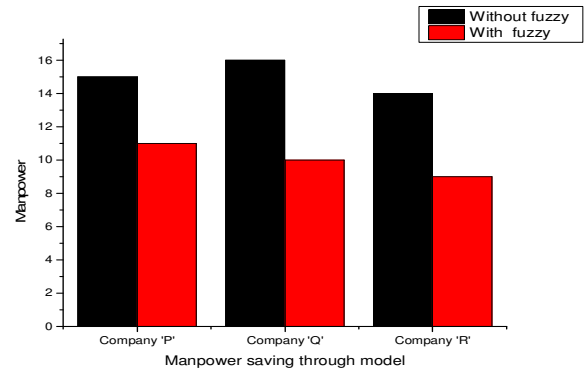


Fig. 6. Total manpower saving through model.

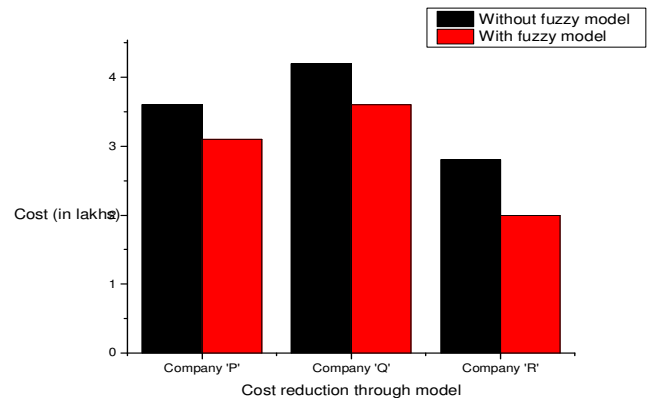


Fig. 7. Total cost reduction through model.

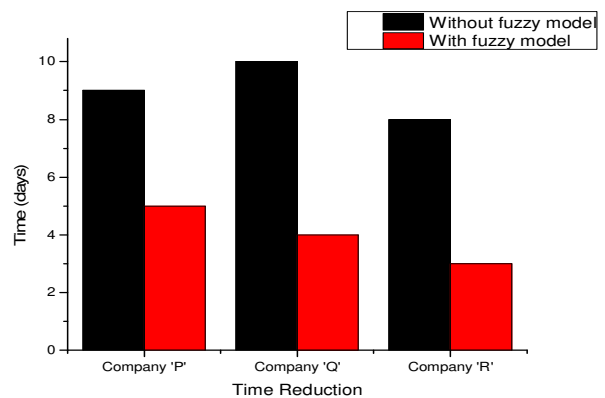


Fig. 8. Total time reduction through model.

#### IV. CONCLUSION AND FUTURE SCOPE

The purpose of this study was to manage risk which arises when we select vendor in the company. We have used the fuzzy logic technique to take care of several conditions in selection of vendor. The new model of Fuzzy logic approach is most suitable for vendor selection in the company. The obtained result shows significant changes in man power reduction, cost reduction and time reduction in decision making. This fuzzy logic concept consider linguistic variables as input data and provides a result which can be fully explained linguistic variable.

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**Conflict of Interest.** The author declares that there is no conflict between any organization and author.

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