

Chapter 12

A Fuzzy-Based Decision Support Tool for Appraisalment of Supplier's Quality Assurance Practices

Chitrasen Samantra

National Institute of Technology Rourkela, India

Saurav Datta

National Institute of Technology Rourkela, India

Siba Sankar Mahapatra

National Institute of Technology Rourkela, India

ABSTRACT

Recently competition in the global marketplace has stimulated immense attention being paid by the enterprises towards securing highest quality, cost effective components and materials, consistently delivered on time. This objective can only be achieved by establishing long term, close working relationships with suppliers, who adopt a proper quality philosophy. Supplier Quality Assurance is the confidence in a supplier's ability to deliver a commodity or service towards satisfying customer's needs. Supplier Quality Assurance can be achieved through interactive relationship between the customer and the supplier; it aims at ensuring the product's 'suitably fit' to the customer's requirements with little or no adjustment or inspection. In the present context, the study develops a decision-making framework to assure as well as to assess suppliers' existing quality philosophy, current policy and related practices. An Interval-Valued Fuzzy Set (IVFS) theory has been adopted to develop such an evaluation model.

INTRODUCTION

In today's competitive market, enterprises have become more committed to produce high quality, reliable, cost effective products that provide customer value, are shipped on time, and contribute to a better environment. The business strategy focused to steady, long-term improvement in products and processes

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is the cornerstone for every successful business entrepreneur. Maintaining customer satisfaction and enhancing shareholder value is a mutual association between the enterprise as well as its enlisted suppliers. To achieve this objective, both must continuously work together to improve the overall efficiency and productivity of design, manufacturing, administrative, and support organizations.

Each enterprise should have well-established Quality Management System (QMS) to achieve these objectives and embrace the principles of continuous improvement. Customer's goals can be achieved by expecting the best from the suppliers (<http://www.hci.com.au/hcisite3/toolkit/quality.htm>). Suppliers are invited to associate in providing the best products with respect to Quality, Delivery and Price. It is believed that a potential supplier base can assist in providing world class product to the customers. To ensure supplier's quality systems conform to the standard quality system requirements, supplier evaluation on quality system as well as manufacturing capability and capacity is indeed necessary. The objective is to support the development of future mutual goals for the enterprises. A supplier should have a Purchasing Representative (PR) and Quality Representative (QR) dedicated to providing the most up to date information available in order to nurture an enduring business relationship.

The US quality guru *Joseph Moses Juran* (born 1904 in Romania) divided the supplier quality assurance process into nine steps (<http://www.businessdictionary.com/definition/supplier-quality-assurance.html>): (1) definition of the product's quality requirements, (2) evaluation of alternative suppliers, (3) selection of the most appropriate supplier, (4) conduction of joint quality planning, (5) cooperation during relationship period, (6) validation of conformance to requirements, (7) certification of qualified suppliers, (8) conduction of quality improvement plans, (9) creation and use of supplier ratings.

Supplier quality issues like non-conformance management, product recalls and product failures are proving fatal for global organizations. More than ever, companies need to proactively address their supplier quality issues before they can damage businesses operations and cause serious supply chain risks and financial losses; especially when current business conditions are unfavorable. Most of the companies are already feeling the heat of the current financial meltdown, putting Chief Procurement Officers (CPOs) and their teams under intense pressure to reduce costs and improve cash flow while simultaneously managing an increasingly vulnerable supply base. As recession starts to bite, there is no place left for supply chain disruptions; any discrepancy in supplier quality can significantly reduce company's revenue, impact market share, increase production cost, threaten brand image and reputation, and lead to high Cost of Poor Quality (COPQ). Organizations can attain systematic reductions in the cost of poor quality by implementing a Quality Management System (QMS) that provides an integrated and closed loop corrective action process.

BACKGROUND

Supplier selection is a critical as well as sensitive task of purchasing departments. This importance is enhanced even more by new strategies in a supply chain, because of the key role played by the suppliers in terms of quality, costs and services affect the outcome in the buyer's company.

Supplier selection is a complex multi-criteria decision making (MCDM) problem in which the objectives are merely of equal importance. In practice, vagueness, uncertainty and imprecision of the targeted goals, constraints and risks to this problem make the decision making process much more complicated. At the same time, vagueness of input data and varying priority importance of criteria attributes need to be considered simultaneously. In real world situations, where decision-makers (DMs) face up uncertain

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