The International Journal of Engineering And Science (IJES)
||Volume|| 2 ||Issue|| 1 ||Pages|| 97-102 ||2013||
ISSN: 2319 – 1813 ISBN: 2319 – 1805

Impact of Certification Program on Supplier Selection to Reduce Quality Cost

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----------**Abstract**----------
The supplier certification program has been expanding in recent years in industries, as they attempt to gain a competitive edge in the world market. The supplier certification program seeks to improve quality and on-time delivery, to share technology, to establish a long-term and stable relationship with a few suppliers, and to reduce cost of quality. This study investigates whether the supplier certification program is effective or not.

Any supplier should be capable to meet the objectives of the buying organization and that have the capability of providing the products or service of most importance to the organization. At this point, however, these suppliers have not undergone a thorough evaluation of their capabilities and objectives by the buying organization. The buying organization must continue to be wary of the products and services provided by its suppliers unless some verification of the capabilities of their internal and external processes has been completed. This approach is referred to as supplier certification. The supplier certification program has been expanding in recent years in industries, as they attempt to gain a competitive edge in the world market. The supplier certification program seeks to improve quality and on-time delivery, to share technology, to establish a long-term and stable relationship with a few suppliers, and to reduce cost of quality. This study investigates whether the supplier certification program is effective or not.

Keywords - *Buyer-supplier partnering, Supplier audit, Supplier certification, Quality cost.*

Date of Submission: 20, December, 2012 ⟺ Date of Publication: 05, January 2013

I. INTRODUCTION

As global competition grows keener, manufacturers are seeking competitive advantages from suppliers. With increasing frequency, manufacturers and suppliers are reporting changes in recent years. One of the most salient changes is the supplier certification program, which has emerged as a recent business practice.

The supplier certification process defined in our study is a formalized assessment program that evaluates the systems a supplier has in place in order to assure customers a product that consistently meets a defined quality level and an on-time delivery time table at a market-driven cost. This program has very specific criteria that a supplier must meet, and the customer has trained personnel that can evaluate the supplier's compliance with these criteria.

Watts and Hahn's (1993) study found that the most commonly cited standards by which suppliers are gauged are quality, delivery, price and service. Their study also indicates that many companies in the US use supplier development programs; such programs have a variety of different emphases. They define a supplier development program as follows:

Supplier development program involves a long-term cooperative effort between a buying firm and its suppliers to upgrade the suppliers' *technical, quality, delivery,* and *cost capabilities* and to foster ongoing improvement.

The ultimate goal of these programs is to form a mutually beneficial *relationship* that will help both firms compete more effectively in the marketplace.

The importance of the relationship between buying and supplying organizations has been increasingly recognized as the nature of competition and business practices change. The Just-in-Time inventory (JIT), Total Quality Control (TQC), Total Quality Management (TQM) and lean production techniques all require changes in buyer-supplier relationships. Many manufacturing firms in the US have established supplier partnerships and the partnering concept has received attention from top managers as well as purchasing managers. Stuart (1993) indicated that partnerships are strong inter-company dependency relationships with *long-term*

planning horizons. He elaborated that the partnering relationship encourages limiting the number of suppliers and emphasized that 'the keys to successful partnering are the sharing of information, the search for continuous improvement, and joint problem-solving efforts. Stuart and Mueller Jr (1994) reported in their study that 'the supplier partnering effort yielded both absolute and continuous productivity and quality improvement when compared with performance during the nonpartnership period. They pointed out that a full commitment to a long-term buyer-supplier partnering relationship is required to support continuing success. This study examines differences between the firms that have adopted a supplier certification program and those that have refused it in terms of the geographic location, the number of suppliers, the average length of contract and the selection program for internal supplier. The certification program represents a change from the traditional sourcing to a new sourcing program. The geographic location of suppliers is an important factor in implementing the JIT inventory system and reducing transportation costs. Japanese automobile companies are known for their close working relationship with lean-production networks of parts suppliers.

A. Certification Efforts:

Objectives of the supplier certification program*:*

The objective is that the suppliers being selected for long-term relationships with the organization are capable of meeting the needs of their works for them. Many were told by customers to begin total quality management (TQM) initiative or they would stop doing business with them. While this created a furor, it did help companies to take seriously the need of the customer. The result has been higher quality product and service from supplier and a more trusting relationship from customers.

II. THEORY DEVELOPMENT

Certification system was started in 1987 by the International Standards Organization with the intention of standardizing process quality tracking practices and product quality conformity assessment across the world. The standards did not gain any significant acceptance until they were incorporated into the European Community's 1989 global assessment procedures that enabled European firms to reject products or services from companies that are not certified by the ISO. Thus, at the end of 1992, fewer than 30000 companies worldwide were certified. Over 20000 of these were in Europe and less than 700 were in the U.S. Since then, the momentum for certification has grown with mounting competitive pressures. By 1997, worldwide certification had risen to over 127000 (an increase of 420%) and the U.S. certification had jumped to over 9000 (an increase of 1340%). By year 2005, up to 150000 U.S. firms are expected to pursue ISO 9000 certification. A recent update (ISO website, press release 830, July 2002) noted the worldwide total of ISO certifications to be at least 510, 616 as of December 2001. Together, these standards spanned a set of twenty elements that cover documentation of all existing processes in a company. These are: 1) management responsibility; 2) quality system; 3) contract review; 4) design control; 5) document control; 6) purchasing; 7)customer-supplied material; 8) product identification and traceability; 9) process control; 10) inspection and testing; 11) inspection, measuring, and testing equipment; 12) inspection and test status; 13) control of nonconforming product; 14) corrective action; 15) handling, storage, packaging, and delivery; 16) quality records; 17) internal quality audits; 18) training; 19) servicing; and (20) statistical techniques [8]. The implementation of these standards is expected to ensure that the certified company establishes documents and maintains a system that ensures process consistency.

A. Certification Paradigms

The history of certification programs has brought about many changes in the concepts and ideas being utilized by industry leaders. Some of the changes that have taken place are shown as below table I.

TABLE I

CERTIFICATION PARDIGMS

Sr. Nos.	Old paradigm	New paradigm
1.	No procurement strategy	Supplier quality management council provides policy & direction, with supplier quality management as a key policy.
2.	One-time procurement	Long-term partnerships.
3.	Lowest price	Lowest long-term ownership cost reduced through joint cost targeting.
4.	Specifications arbitrary	Established through design of experiment.
5.	Poor assessment of process capability	Goal of minimum process capability of 2 to 8 through use of DOE.
6.	Measurement through AQLs or PPM	C_{pk}, cycle time, yield, SPC charts.
7.	Few incentives	Incentives built into selection process and performance criteria.
8.	Reliability testing included accelerated life tests.	FMEA, Taguchi, Weibull
9.	Individual departments talking to supplier for their need	Commodity teams coordinating corporate objectives and assisting supplier with quality improvements.
10.	Cycle-time not considered	Important part of overall TQM effort.

Some leading organizations have shifted completely to the new paradigms, while others have done so partially. Each buying organization must consider all the benefits and risks of shifting to the new paradigms before making a blind move.

After 1991, 84% of the company's business goes to certified suppliers.

Following are the five basic conditions or rules for suppliers:

1. Understand and agree to all quality requirement identified in specifications.
2. Resolve all major quality problems to the satisfaction of all user plants.
3. Develop and document a quality plan outlining the process and product controls used to assure conforming products.
4. Prepare to provide to a visiting certification team evidence that your quality system is working.
5. Define and institute a system to achieve annual quality improvement.

Now the most of the companies has demanded that its suppliers have an ongoing annual quality improvement program coupled with an education process for their people.

B. The Supplier Audit:

Verification is one of the first objectives that needs to be met when trying to certify a supplier. It is extremely important to determine if the supplier is worthy of being considered for a long–term relationship with the buyer. One of the way to do this through a supplier audit. In a supplier audit, the buying organization establishes the criteria it wants to verify that the supplier meets. Some of the criteria should be standard for all suppliers of the firm, while others are more commodity or industry specific.

The following are a few of many potential areas of concentration for supplier audit teams.

- **Management:** Commitment to quality, style, empowerment, educational background, previous experience, etc.
- **Design process:** What is the design process? Is it systematic? Does it involve appropriate affected areas or only R&D?
- **Procurement:** Is the procurement process fast? Are levels of authority clearly defined? Are customer requirements considered in the bidding process? Is price considered before quality? Are all affected parties involved in major procurement decisions? Does the supplier have up-to-date procurement systems? Does the supplier use or plan to use electronic data interchange?
- **Quality assurance:** How does the supplier assure the quality of the process output? Is it inspection driven or does the supplier methodology include prevention –based methods?
- **Receipt inspection:** Does the organization simply accept all products as supplied? Does it have different policies for different levels of supplier certification? Is the supplier's goal to reduce the amount of incoming inspection by certifying its own suppliers? Is there a clear way of separating rejected materials from acceptable materials? What are the return policies?
- **Material management:** Does the supplier have up-to-date material management system? Are there policies for the optimization of stocking levels? Is just-in-time manufacturing practice followed?
- **Material storage, handling, and shipping:** Are there controls for shelf life of time-dependent raw materials? Are toxic materials properly secured, labelled, handled, and protected to safe guard against environmental accidents? Are modern, up-to-date material handling equipment used and proper maintenance procedures followed? Are products properly protected during shipping through adequate packaging?
- **Process management:** Are process controls in place? Are employees trained to recognize out of control conditions and know what actions to follow to bring the process back into control? Is there a good tie from the process management area to improvement processes?
- **Inspection, testing, and examination:** Are first item samples sent for testing and inspection before approval of initial shipments from a new supplier? Are follow up inspection made until the supplier attains the appropriate certification level according to the acceptable risk of a defect?
- **Specification and change control:** Is there a set methodology to keep track of and assure that specification and process changes are recorded and approved by all involved before implementation of the change, that all employees affected are properly trained in the new procedures, and that lots are properly tracked to reflect the process in effect when the lot was manufactured?
- **Calibration and lab controls:** Does the supplier have a periodic maintenance and testing schedule to calibrate all measurement devices? Is the schedule in place in the lab area as well as on the manufacturing floor or anywhere else that measurements are made?
- **Quality information:** Has quality information system been put in place, whereby information can be tracked by lot, supplier, timing process status, customers, rejects, costs, or any other data field that the supplier or the buying organization may feel is an important quality characterstic?

- **Nonconforming material control:** Is there a method in place to identify and tag nonconforming materials, whether incoming or work in process? This material must be excluded from the regular flow of work in order to avoid the possibility of it being combined with acceptable material.
- **Corrective action process:** Does a method exist to follow up on corrective actions identified by all levels of employees? This could range from a suggestion system to a more sophisticated team improvement project tracking system.

- ***Types of Certification:***

Some of the different types of certification processes in use throughout manufacturing and service industries today are:

1) Some Specific Certification programs: Each buying organization could determine the criteria it deems important and the process it will use for supplier certification. The main reason an organization would use these criteria is that it is in a very unique industry and has very specific needs that would not be covered by one of the standard industry criteria.

2) Standard industry certification processes: Rather than developing their own certification processes, some companies use standard industry certifications. This is a much easier approach because these processes are readily available and they represent the most important generic requirements to verify that the supplier is followed good quality management practices. These programs do not specifically certify any particular products or service of the supplier, but instead examine the processes and methods that the supplier organization follows. It is then left to the buying organization to assure that the quality specifications for the specific item or service are met. Some of the standard industry certification processes are as follows:

- ISO 9000: This is an international specification that has been accepted by over 100 countries.
- Malcolm Baldrige National Quality Award: When an organization applies for this award, it must perform an in-depth self-appraisal. The appraisal includes seven major areas of reviews. This assessment is provides to the National Institute of Standards for review by a Board of Examiners and judges composed of quality experts. An award winner must demonstrate excellent preventive based quality processes, through deployment of these processes, and significant improvement results at world-class levels. Therefore, a Malcolm Baldrige Award winner can probably be considered to have good quality processes and to provide quality products and services. Again, specific products must be certified individually by the buying organization against its specific requirements.
- Governor's Sterling Award for Quality and Productivity: This is the state of Florida's quality award. It is patterned after the Malcolm Baldrige Awards, but has been expanded to include some sectors not included in the Baldrige.
- The Deming Prize: This is one of the most prestigious quality awards. It is given in Japan. One of the categories is the international award. Florida Power & Light is the only company outside of Japan that has ever won that award. The criteria are very systematic and follow the teaching of Deming, Juran, Ishikawa, and many of the Japanese gurus. The award program is administered by the Japanese Union of Scientists and Engineers (JUSE).

It is important to reiterate that even though a supplier may have received one of these awards or certifications, it is still up to the buying organization to determine if the criteria are sufficient for their own quality needs. Most importantly, the buying organization must be sure that its own quality specifications are being met adequately for specific products and services.

Influence of Certification on supplier selection: Different suppliers can be certified in different ways. Some of these certifications are unique to the buying organization, while others are more standard.

As shown in "figure- 1"., 71.5% of the respondents to a survey conducted by Electronic Buyers News concurred that they were influenced by knowing that a supplier under consideration had received some form of certification, either standard or specific, as defined earlier. Of these certifications, the respondents most frequently selected the Malcolm Baldrige Award as the certification that most influenced them. ISO 9000 certification and individual company certification were the next most frequently identified. It is important to note that other awards and other company certifications were also influential.

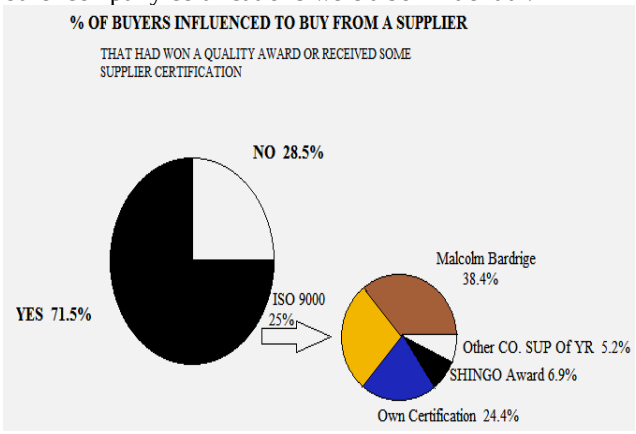

Fig. 1 Certification Influenece (Source: Electronic Buyer News)

C. Supplier Quality Cost:

Supplier quality cost is significant and good indicators of problem areas. A system of managing and tracking supplier quality cost are categorized as prevention cost elements such as the cost of supplier quality survey, appraisal cost elements such as the cost of receiving and source inspection;, and failure cost elements such as the cost of scrap and rework of supplier caused non-conformances and the cost of site visits to correct supplier service problems.

Hidden Supplier Quality Costs:

There has been hidden supplier quality cost in any quality cost system. Hidden supplier quality costs are divided into three parts:

- Those incurred by the supplier at the supplier's facility
- Those incurred by the buyer in solving problems at the supplier's facility
- Those usually not allocated to suppliers but incurred by the buyer as a result of potential or actual supplier problems.

Quality costs incurred by the supplier at their facility are unknown to the buyer and, therefore, hidden. Even though the magnitude is hidden, the types of costs are not. They are the same types of quality costs the buyer incurs.

The second type of hidden cost, that which is incurred by the buyer in solving problems at the supplier's facility, is usually not specifically allocated to suppliers. Except for an awareness of troublesome suppliers. An example is the cost to the buyer of sending a quality engineer to a supplier to resolve a crisis.

The last type of hidden quality cost occurs at the buyer's facility. This type of cost may include the following:

- Specifying and designing gages that must be used by the buyer's receiving inspection and, perhaps as well, by the supplier prior to shipping.
- Designing appropriate specifications that the supplier must follow in the manufacture of the product or performing the service.
- Adding special inspection operations and quality control effort in the buyer's.
- Production line related specifically to a supplier product.
- Reviewing test and inspection data on supplier material to determine acceptability for processing in the buyer's facility.
- Calibrating and maintaining equipment necessary in the quality control of supplier material.
- Losing production time due to unavailability of good material.

Field engineering required to analyze and correct a problem caused by a supplier.

Due to the certification program supplier must follows the guidelines which has been beneficial for improving quality of the product and reduction in quality cost.

III. CONCLUSION

Survey results indicate that 46% of the respondents are involved in a certification program. Firms with supplier certification and firms without a certification program consider quality as the number one concern.

Respondents from firms without a certification program believe in the traditional purchasing philosophy, which is based on market competition and spot market bidding. They are much more concerned about problems associated with a single source.

We conclude that a supplier certification program has a significant impact on quality, buyer-supplier relationships, cost, delivery, cooperation and technology sharing. Quality change as measured by rejection rates shows a remarkable improvement. Significant reductions in rejection rates were realized in the first three-year period.

Second, suppliers have to meet the challenging requirements of high quality, on-time delivery schedule and low costs. The supplier certification program may reduce suppliers' profit margins and may also lead to lax market monitoring as buyers and sellers continue to move toward the long-term relational contracts. However, long-term relational contracts should improve the commitment and trust between buyers and sellers.

Third, it will be interesting to see if supplier certification programs will continue to command the same attention of managers despite their diminishing impact. Partnering relationships and monitoring the performance of suppliers require constant communication and long-term commitment to bring continuing success.

Fourth, a third-party certification program has been emerging as a new way of economizing the certification process. GM, Ford and Chrysler recognize each other's certification program and call it QS 9000. The ISO 9000 has also been recognized widely and has become an industry standard. Quality has been improving so rapidly in the US that it may not be a concern of competitive strategy in the future.

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