

## Vendor-Manufacturer Cooperation for Inventory Reduction and Other Gains

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*Increasing competition and changing production technologies are making it necessary for manufacturing companies to establish closer and more meaningful relationships with vendors. This study examined the experiences of three local manufacturing companies which are involved in vendor-based quality improvement programs. Focus of the research was on the nature of the vendor programs, the vendor selection process, problems encountered during implementation, and major benefits derived.*

There is no question that quality is the issue for the 1990s. Many companies have responded by incorporating quality programs into their manufacturing and service process. However, getting manufacturing quality up to world class standards and keeping it there is a complex project, involving no less than the entire corporate machinery including the network of suppliers.

The purchasing function plays a crucial role in the effort. The significance of this aspect of the business can be seen in the potential that the purchasing operation holds for increased efficiency, and therefore, cost savings and profit enhancement for the firm.

Vendor management, an important segment of the purchasing function, carries with it a host of possible gains -- improved quality, better product designs, reduced order cycle time, reduced production costs, and lower levels of inventory. In addition, depending on the type of relationship a company has with its suppliers, the adoption of new systems and technologies, such as *JIT* or *MRP II*, could be facilitated or hampered.

There is general agreement that the key to achieving positive results is better communication between the buying firm and the supplier. Vendor management, by its very nature, requires a bi-directional exchange of vast quantities of information between the two parties (Carter, 1986). This is a direct contradiction of the traditional approach to dealing with suppliers wherein "communications tend to be guarded for fear of revealing information that one side might turn to its advantage when dealing with the other" (Galt & Dale, 1991).

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The adversarial relationship promises nothing to a company wanting to produce high quality products. What is needed is the development of long-term supplier relationships. Substantial changes in behavior and attitude are necessary on the part of both buyer and vendor. The relationship must be grounded on common aims, mutual trust, cooperation, and a joint problem-solving approach.

For years the practice has been to purchase the required parts and materials from several sources. The result has been to create a large supplier base, with frequent switches between suppliers to keep them competitive. The purchasing decision has been based largely on price (Galt & Dale, 1991).

Today, a growing number of manufacturers are realizing that many other factors may be relevant and helpful in assessing vendor performance. Furthermore, a systematic way of relating these factors with one another can serve the purpose of generating a composite measure by which vendors can be compared (Timmerman, 1986).

## **1. Earlier Studies**

A number of foreign authors have conducted studies on supplier development programs (Bernard, 1989; Crosby, 1985; Dumond & Newman, 1990; Freeland, 1990; Galt & Dale, 1991; Nelson & Jambekar, 1990; Raia, 1985). Most of these works highlight the successful implementation of programs such as *TQM* and *JIT* purchasing. There were common key points raised by these authors. First, in the development of long-term relationships, it is clear that vendor base reduction is necessary. This makes it imperative for the buying firm to design an accurate and concise rating system that would lend some degree of objectivity to the process of selecting and monitoring vendors. For years, certification has been based on lot rejection history, existence of quality data based on SPC and similar reports. A major criticism of this approach is that historical data on vendor performance might be lacking and subject to misinterpretation. Another criticism is that emphasis of this approach is on past and present performance rather than on the capability of the vendor to achieve higher levels of quality and technological sophistication in the future.

The second common key point is that an effective vendor performance management program must be able to allow continuous communication and joint monitoring, mutual support, and problem resolution. Closing the gap between the buying company and the vendor can be achieved through several activities, such as the development of a joint production planning system, the establishment of a production-purchasing interface, vendor capacity planning, and transfer of technology.

Accounts of successful vendor programs abound in foreign literature. A client (electronic component manufacturer) of Phillip Crosby Associates, Inc. reported the benefits of its Supplier Quality Improvement Process to include a 60 percent reduction in supplier base, near zero-defect deliveries from many suppliers who started working to parts-per-million defect level, a 20 percent drop in failure costs (components became more reliable and



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fewer required return), and enhanced communication with all remaining suppliers (Crosby, 1985).

Raia also reported the benefits achieved by Xerox Corporation and Ford Motor Company (1985). For five consecutive years, from 1980 to 1985, Xerox was able to reduce its production cost for copiers by an average of 10 percent per annum. Xerox attributes most of these savings to the closer working relationships it had established with many of its suppliers. Ford Motor Company, on the other hand, was able to reduce the rejection rate of purchased relays from 40 percent to less than one percent within eight months, by working closely with some of its suppliers. This improved the net production rate for suppliers from 3,000 relays per line per shift to 6,000. The supplier's manufacturing costs for the relay were also reduced by 20 percent.

## **2. Objectives of the Study**

Little is written about vendor management programs in the Philippines. More sparse are those which are made available for public consumption. Needless to say, much can be learned from the experiences of local companies which have successfully implemented vendor-related activities. There is a reasonable chance that unnecessary anxiety among companies planning to launch vendor programs could be avoided. A framework for implementation could be more easily developed, and anticipated problems could be more easily handled.

This article was written with the primary purpose of relating the experiences of three companies which are involved in vendor-based quality improvement programs.

## **3. Methods**

Only three companies were involved in the study. These are Hygeia, Bloom, and Mold Master.<sup>1</sup> Hygeia is a large manufacturer of health care products. Bloom is the country's largest manufacturer of cosmetics. Mold Master is a producer of plastic containers and a supplier to both Hygeia and Bloom. The main criterion used in the selection of respondents for the study is willingness of the firm to give detailed information about their quality improvement program. Choice of the third company, Mold Master, was influenced to a large extent by suggestions from both Hygeia and Bloom.

The research, which was conducted during the period August - November 1993, involved several plant visits and interviews with key people who were responsible for the supplier quality programs. The research method was generally unstructured to allow both researcher and respondents flexibility in discussing details of their quality programs. The main information requested included the following:

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<sup>1</sup> The names of the participating companies have been disguised.

- Company background
- Vendor selection process
- Vendor program
  - Nature and components
  - Manner of implementation
  - Problems encountered
  - Benefits
  - Future plans and programs

#### **4. Findings**

##### **Hygeia**

*Company Background.* Organized in 1956, Hygeia (Philippines) is an affiliate of Hygeia, U.S.A., a corporation with headquarters in New Jersey. Hygeia is the world's largest and most comprehensive manufacturer of health care products.

Hygeia (Philippines) consists of three operating units—the Consumer, Medical, and Janssen (pharmaceutical) divisions. In 1993, it had 701 employees, of which approximately 288 were production workers. Except for one, all were Filipinos, including its president and managing director.

Aside from its regular work force, 600 employees of supplier companies are doing specialized work for Hygeia, such as contractual services, sales forwarding, sales van dealerships, and trucking. Hygeia is also a major buyer of materials from local suppliers which employ more than 5000 employees.

Sales of Hygeia exceeded P1.7 billion in 1992, making it rank 99 among the country's top 1000 corporations during that year. Local purchases during this period were approximately P300 million.

Hygeia's *JIT* list includes 71 percent of all raw materials and 67 percent of all packaging components. Non-stock materials are not part of the *JIT* materials list because these are not directly used in production and are not commonly ordered.

Hygeia's major product lines include baby products, feminine hygiene, adhesive bandages, anti-diarrheal OTC drugs, and anti-vasoconstrictors. A total of 85 per cent of the products it sells are manufactured in the Philippines. Only 15 per cent are imported professional specialty items.

In the manufacture of its products, the company requires a total of approximately 2,265 components and materials, which are classified as stock (raw materials and packaging supplies) and non-stock (miscellaneous items). About 30 per cent of all stock materials and 1.3 per cent of non-stock items are imported.



Hygeia has 40 major suppliers out of its vendor base of 238. The classification is based on the amount of business given to specific suppliers. In general, the company follows the 80/20 rule of doing business. At present there does not exist any exclusive relationship with any vendor.

*Vendor Selection.* Hygeia uses three major criteria in the selection of suppliers. These are: conformance to specifications, timeliness of deliveries, and existing quality standards. Suppliers are evaluated by cross-functional teams from Quality Assurance, Production, and Purchasing.

Stock vendors which supply *JIT* materials (critical materials which forego initial inspection) are expected to attain 10 approved deliveries to continue supplying the *JIT* material. Of Hygeia's 40 major suppliers, eight are in the *JIT* list.

*Hygeia's Vendor Program.* The company started with its Supplier Quality Management Program (*SQMP*) in 1983. Although the program is available to all suppliers, it is specifically targeted for Hygeia's 40 major vendors. The *SQMP* is expected to improve vendor-manufacturer relationships through the following activities:

- Seminars on *TQM*
- Cross-functional teams (decision-making groups for vendor selection and evaluation)
- Supplier quality teams (special teams formed to work in cooperation with specific suppliers on the resolution of quality and related problems)
- Supplier base reduction and development of long-term relationships
- In-house supplier training on new technology
- Supplier quality awards (Suppliers are evaluated monthly on the basis of the following: efficiency in delivery, lead times, adherence to GMP, documentation accuracy, and overall quality of products delivered.)
- Corrective action (Suppliers who do not meet specifications are subjected to performance evaluation and given suggestions on how to improve. Vendors who continue to deliver substandard items are removed from the supplier base. Special attention is given to suppliers of *JIT* materials.)

*SQMP Implementation.* No major problems have so far been reported in connection with the *SQMP*. Possible explanations include the following.

- The transfer of information dwells more on promoting quality practices, and quality as a way of life. Suppliers perceive these efforts as sincere and applicable to other customers. Moreover, the vendors do not spend anything.

- Hygeia orders in very large quantities, making it difficult for vendors to ignore the program.
- Upgrading to new and more efficient machines is never forced upon the supplier.

Hygeia does not mind that the *SQMP* and the accompanying transfer of information may benefit competitors. In fact, the company has always been very open to sharing its experiences on *TQM* practices.

*Benefits.* The *SQMP* generated modest improvements in several areas. Directly measurable benefits include the following:

- Reduction in lead time by 50 per cent since 1989
- Reduction in the size of the Quality Assurance Department by six positions
- Reduction in inventory levels for raw materials and components from an average of 42 days in 1992 to 25 days in 1993
- Reduction in rejection rate from 15 per cent in 1983 to 2.1 per cent in 1992
- Improved delivery efficiency from 80 per cent in 1989 to 89 per cent in 1992

The reduction in inventory levels is also a direct effect of the company's *JIT* purchasing program. For most of Hygeia's *JIT* materials, vendors are required to deliver in smaller quantities daily. Incoming inspection is no longer done for these items.

The *SQMP* emphasizes problem elimination and quality improvement. It is actually more aggressive than traditional quality control. However, with the practice that Hygeia no longer conducts inspection, it must have complete confidence in the vendor and the quality of its deliveries, making it possible for the firm to take the risk of vulnerability resulting from the much lower "just-in-case" inventory.

*Future Programs.* Hygeia is currently developing *SQMP* II. This program aims to attain far reaching effects on inventory reduction and manufacturer-supplier relationships. It will initially be implemented among a group of pilot vendors before the bigger roll out to all suppliers. The pilot list includes only three suppliers -- two major plastic suppliers (including Mold Master), and a polybag vendor.

*SQMP* II will have two additional features, namely: 1) Continuous quality education which will involve extensive training for suppliers on GMP, SQC, SPC, and related topics; and 2) Cross-functional teams working in the suppliers' plants for the purpose of material specifications review and monitoring.



Initial *SQMP* II activities have already been launched starting September 1993. Roll out to major suppliers will be undertaken if the pilot tests are successful. The success of *SQMP* II will be assessed in terms of reduced wastage and decreased costs.

## **Bloom**

*Company Background.* Bloom (Philippines) is the largest cosmetics company in the country. It is a subsidiary of Bloom Products, Incorporated, a U.S. corporation based in New York. As of 1993, there were 38 Bloom companies worldwide serving consumers in more than 100 countries.

Bloom (Philippines) exports to Malaysia, Taiwan, Indonesia, and China. It is the only affiliate with the expertise and technical capability to reformulate products for the Asia-Pacific market. Reformulation has been found to be necessary to suit local tastes and climate.

In 1993 Bloom had a total of 320 employees, about 150 of whom were production workers. The company utilizes a basically manual production system which has been found to be cost-efficient.

In 1992 Bloom recorded sales of about P4 billion, representing approximately 26 per cent of the total market of P15 billion. The business is presently growing at the rate of 30 percent per annum.

Bloom had 300 local product lines and 100 items for export as of 1993. These products were grouped according to the following categories: makeup, fragrance, skin care, daily needs, hair care, and gifts and decorations. These products may also be classified according to the degree of testing required -- hold items and go items. Hold items are those which are susceptible to bacterial contamination, such as pressed powder, lotions, shampoos, and lip sheeners, and therefore require microbiological testing. Go items, on the other hand, are those which are alcohol based. Go items do not require testing for microcontaminants.

To support its product lines were about 50 vendors supplying approximately 150 different components and materials. On the average the company maintains about two to three vendors per component.

About 95 percent of all manufactured components are locally purchased. These include soft components (cartons, wrappers, and finishes) and hard components (plastics, caps, tubes, and compacts). Practically 100 percent of the raw ingredients are imported.

*Vendor Policies.* Bloom does not have any exclusive relationship with its suppliers. However, it has maintained practically the same vendors throughout its many years of operation. Suppliers are considered business partners, and so far, Bloom has not removed any vendor from its list. Poor performers are placed under probation, and the amount of

business given to a supplier, which ranges from 90 percent to about 10 percent, depends on the supplier's historical performance.

Bloom's packaging and quality assurance departments conduct in-house training of suppliers for purposes of setting specifications and tolerances and exploring the possibility of product and process improvements. Bloom's quality requirements for materials and components are generally stricter than those of the industry.

*Vendor Program.* Bloom introduced its Supplier Quality Improvement Program (*SQIP*) in July 1993 with the main objective of improving component quality and reducing inventory costs. It has been designed for implementation in three phases.

Phase One involves basic system installation and control. It covers the following major activities:

- Establishment of a Material Review Board (MRB)
- Development of a vendor corrective action system
- Quality data reporting (specifically on defects and lot acceptance rates)
- Vendor rating and ranking
- Vendor categorization (Suppliers will be classified as Approved, On Probation, or Dropped)
- Capability update and assessment
- Vendor loading analysis
- Back-up planning and development of alternate sourcing scheme
- Concurrent engineering
- Specifications review, update and control
- Upgrading of GMP protocol
- Development of a mold maintenance system
- Design of a quality system survey checklist

Phase Two focuses on the quality improvement process and vendor base evaluation. The following activities are involved:

- Quality Improvement Process



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- Thorough vendor audits/assessments
  - GMP protocol implementation
  - Extensive vendor training (on quality concepts, 5S + 1 housekeeping activities, and GMP)
  - Identification and resolution of major safety issues
  - Installation of pre-delivery inspection system
  - Vendor base evaluation
    - Partnership
    - Volume consolidation
    - Continuous training (on *TQM*, *JIT*, *SPC*, quality circles)

Phase Three covers the development of a “capable” supplier base and supplier certification. This phase involves the following activities:

- Capable supplier base
  - Process simplification
  - Elimination of wastes
  - Lead time reduction
  - Productivity improvement
- Supplier certification
  - Reduced sampling
  - Skip lot inspection
  - Dock-to-stock certification
  - Long-term contracting
  - Awarding and recognition
  - Continuous improvement

*SQIP Implementation.* As of November 1993, 12 of Bloom's vendors had already participated in the program. These are local suppliers of plastic components. Bloom chose to concentrate on plastic suppliers because of the serious quality problems, such as the presence of dust, dirt, and foreign materials in plastic containers, excess plastic, and failure to follow specifications.

Bloom encountered minor resistance from suppliers initially chosen for the program. Majority of these companies are not professionally run and are hesitant to accept suggestions on workplace organization, reduction of overhead, and upgrading of processes. Only three of the 12 suppliers have some form of quality program. In addition, most of them carry large amounts of inventory which translates to lower margins for the vendors.

Bloom's volume requirements are, however, generally large enough to exert influence on their suppliers to cooperate.

*Benefits.* Although Bloom has not fully implemented the *SQIP*, significant improvements have already been noted. These include the following:

- Reduction in inventory level by approximately 40 percent
- Reduction in the rejects rate from 19 percent to 5 percent for final products
- Reduction in plastic component rejects from 3 percent to 0.2
- Reduction in the number of QA inspectors
- Reduction in delivery lead times
- Full disclosure of production plans

*Future Plans.* Bloom is currently programming the involvement of all of its suppliers in the *SQIP*. The company hopes to be able to move into *JIT* purchasing as soon as its major suppliers have demonstrated substantial quality improvement. Eventually, Bloom expects inventory of components to be reduced significantly, thus bringing inventory costs to much lower levels.

## **Mold Master**

*Company Background.* Mold Master, a manufacturer of plastic containers, was established in 1980. It started operations with 30 workers and seven machines -- five blow molding machines and two injection equipment. As of 1993, the company had a total of about 400 production workers and 30 office personnel.

Mold Master operates 24 hours daily, producing plastic containers for industrial use and cosmetics. The company generally fabricates the molds used for its customers, but prefers that these be done externally. In-plant fabrication of molds requires a lot of operational



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details (sample preparation, testing, modification, and so on) which take up a significant amount of productive time.

The company's industrial clients (mostly oil refineries) account for about 55 percent of peso sales, but only about 45 percent of sales volume (in number of items).

Mold Master has seven major clients (including Hygeia) which account for approximately 97 percent of total sales. Bloom's business with the company is substantially lower compared to transactions with Hygeia. In other words, Mold Master is not a major supplier of Bloom.

*Vendor Issues.* Two major materials are used in the manufacture of plastic containers -- plastic resins, which account for 98 percent of the total cost of materials and colorants. Plastic resins are 100 percent imported; there are no local manufacturers. Colorants, on the other hand, are 100 percent locally sourced.

Plastic resins are imported from Singapore. The company has three suppliers, two of which are nominated suppliers (specified by clients).

Mold Master retains the same suppliers as much as possible. As far as nominated vendors are concerned, the company actually has no choice because they or the brands they carry have been identified by the company's clients as part of their requirements.

The supply and prices of plastic resins are affected by world economic conditions and major events, such as oil crises and wars. During these periods, prices sometimes double.

The company maintains an average of 1.5 months of inventory of both plastic resins and colorants. Even local suppliers are very unreliable, making it difficult to keep smaller amounts of stock.

*Relationship with Customers.* Mold Master's customers have done business with the company for years. Most of them have transacted with Mold Master since it started operations in 1980.

*Customers specify volume requirements and schedules.* The company studies these specifications, and requests for adjustments only when absolutely necessary. As soon as Mold Master and the client have agreed on the production volume and schedules, it becomes a commitment on the part of Mold Master to deliver accordingly. And this usually becomes the basis for the performance appraisal of the company as a vendor.

*Customers' Quality Improvement Programs.* Mold Master is a participant in the quality improvement programs of four of its customers (Hygeia and Bloom included). The company sees only positive results from participation -- improved productivity, quality, and efficiency. Mold Master also views their involvement in these programs as a bonus to their other customers.

Mold Master's participation is heaviest with Hygeia. Its involvement in Hygeia's *SQMP* began in the early 80s. However, significant improvements have been achieved only lately, with Hygeia's implementation of *JIT* purchasing.

Under *JIT* purchasing, Mold Master is required to make daily deliveries. The system evolved as follows: at first, delivery was on a monthly basis. But Hygeia noticed that suppliers delivered very close to the last day of the month, and so brought this down to 15 days, and then one week. Today, deliveries are made daily.

Hygeia has a rating system that applies to timing of deliveries and quality of items delivered (in terms of defects rate). And based on the certificate of compliance, incoming materials from Mold Master are no longer inspected. However, if defective items are found in the production line, the entire lot is withdrawn and returned to Mold Master.

The quality improvement program of the company's clients have slight differences, but are not in conflict with one another. The differences lie mainly in the standards. For instance, Bloom's specifications are stricter than Hygeia's. Mold Master, however, does not find difficulty dealing with this because individual clients have a machine or machines assigned to them. Only when the requirements of a particular client are low does Mold Master use the committed machines for other purposes. But these are reassigned to the original client as soon as required. Changeover time is not significant.

Mold Master did not make any capital outlays in the course of its participation in the programs of the four clients. However, the company needed to spend on logistics in connection with training programs sponsored by the customer.

*Benefits.* Mold Master attributes most of the improvement in their operations to Hygeia's program. Although the other customers' quality programs are generating positive results, Hygeia's move to implement *JIT* purchasing has put much greater pressure on Mold Master to institute reforms in the plant. These changes are not in the form of equipment acquisition, reorganization, or increase in work force. The company has simply focused on improving the quality of its work force through training, and replacement of employees who voluntarily leave the company with better qualified people.

Among the significant quantifiable benefits are the following:

- Reduction in the average inventory level from 3 months to 1.5 months
- Increase in efficiency by 10-15 percent
- Reduction in production cost by 7.5 percent
- Decrease in rejection rate from 3 percent in July 1993 to 0.2 in October of the same year



- Improvement of delivery performance from 65 percent in July 1993 to 99.97 percent in October of the same year.

*Future Plans.* Although moving into *JIT* manufacturing seems to be a natural next step for a supplier participating in a client's *JIT* purchasing program, Mold Master finds it hard to see itself going into it because of the nature of its machines. The blow molding output, for instance, is less than the output of the printing machine. On the average, the blow molding machine turns out 12,000 units daily while the printing machine turns out 70,000. The company is, thus, forced to maintain in-process inventory.

The average in-process inventory is five days to one week, while the average finished goods inventory is two to three days. Mold Master believes that it would be very difficult to further bring these levels down. Bringing them to a higher level is likewise impossible because of the limited warehousing space. To Mold Master, the current inventory levels are optimal.

The company sees no way to expand other than to make better use of available space. The company plans to replace existing machines with machines that have more cavities (e.g. four molds instead of two). These machines would occupy essentially the same amount of space, but would be able to produce more.

## **5. Discussion**

The purchasing function is responsible for providing the company with an uninterrupted flow of materials of specified quality, keeping inventory expenditures low, developing reliable sources of supply, and developing long-term relationships with quality suppliers. This makes the purchasing function critical competitively, and highlights the need for suppliers to be folded into the company's quality program.

Growing competition and rapidly changing production technologies are making it imperative for buying firms to create closer and more cooperative relationships with its vendors. Such partnerships present opportunities that might otherwise be unavailable to each of the two parties. Substantial savings may be realized in terms of reduced inventory costs, inspection costs, defect costs, material costs, and costs associated with changing scheduled production.

The information generated by this study is evidence that vendor-manufacturer cooperation is a potent strategic move. Although the reader is cautioned against drawing liberal interpretations of these findings because of the very limited sample, there are clear indications that if handled properly, supplier quality programs should produce at least modest benefits for both buyer and vendor.

Based on the results of the study, four key points should be considered. First, convincing suppliers to participate in the quality program would be easier if the buying firm offers more business. Hygeia is a major customer of Mold Master. Mold Master found it necessary to get involved in Hygeia's *SQMP*. Its participation in the quality programs of

its other customers, including Bloom, was encouraged by the results of Hygeia's program. It is the bigger, and long term payoff that has motivated the company to make Hygeia's quality program a top priority.

Second, for a supplier program to gain ground, the buying firm must first focus on improving internal quality, to set a strong example to vendors. Both of Hygeia's *SQMP* and Bloom's *SQIP* are components of *TQM* programs that necessarily involve internal quality improvement.

Third, less resistance would be expected if the buying firm does not emphasize facilities expansion, upgrading of equipment, or any activity that would require large investments. Mold Master's participation in the supplier quality programs of Hygeia and Bloom did not put pressure on the former to spend on capital projects. In fact, practically all of the expenditures associated with the quality programs (training and orientation costs, consultancy fees, and so on) were shouldered by Hygeia and Bloom.

Lastly, vendor base reduction is necessary if the buying firm desires to develop meaningful long-term relationships with suppliers.

## **6. Areas for Further Inquiry**

Many local companies are beginning to see the importance of implementing quality management programs. What would be interesting to find out is whether these programs integrate activities associated with vendor development, and to what extent. Further research involving a larger sample size would also make it possible to draw conclusions about the effectiveness of supplier quality programs in terms of reducing lead times, inventory levels and inventory costs, rejects and defects rate.



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