QUALITY MANAGEMENT IN PRACTICE

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Many local companies have started to recognize the necessity of incorporating elements of the quality process into their operations. Some of them have already launched quality management programs. The objective of the present study is to take a closer look at these quality management programs and practices through a survey of 46 local manufacturers. Results of the survey indicate that manufacturing companies are gradually moving towards the direction of TQM, although certain traditional approaches remain prevalent.

INTRODUCTION

Kaufman (1992) defines Total Quality Management (TQM) as "a continuous process which intends to deliver to clients what they want, when they should have it." The overriding concern underlying this definition is customer satisfaction. Companies must have a focus that begins with the customer, both external and internal, if they want to remain profitable and competitive. World Class quality competition is on the national agenda. And there are a host of factors that put pressure on companies, large and small, to start addressing issues of quality, such as, better educated consumers, liability claims, warranty costs, scrap and rework costs, and opportunity costs associated with lost sales (Diminnie, 1989).

Since 1983, the Philippine Quality and Productivity Movement (PQPM) has held national congresses centering on the importance of quality and productivity to nation-building and survival. The country's economy has not been sound and with its meager and costly resources, there is apparently no other choice but to strive for quality and productivity improvement, and to deliver products and services to the market in the shortest possible time. However, productivity improvement may be a secondary concern. Although quality and productivity are unquestionably related, there can be no economic value in increased productivity if consumers refuse to accept a product because of poor quality.

To cope with the pressures of competition, many local companies have started implementing quality management programs, or at least incorporating elements of the quality process into their operations. An increasing number of manufacturing firms now realize that quality must be a concern in every aspect of the manufacturing arena, including paper work, information sharing, product design, equipment maintenance, working conditions, and customer relations.

The primary purpose of this paper is to present the results of a survey of current practices in quality management among Philippine manufacturers, and hopefully draw some tentative conclusions.

METHODOLOGY

The present study has employed a procedure based on the empirical research conducted by Diminnie in 1989 which involved twenty-four New York firms - 11 manufacturing and 13 nonmanufacturing firms. A questionnaire has been developed (Exhibit 1) covering seven main points:

- o definition of quality
- o monitoring of quality performance
- o training of employees
- o use of quality control procedures
- o selection of vendors

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- o treatment of substandard products
- o cost of quality assurance

A total of forty-six manufacturing companies have participated in the research conducted between October 1992 and March 1993. Because of the nature of the data sought, the sample could not be selected at random. Willingness to disclose the required information was the main basis for selection of companies for the study.

Of the total sample, thirty-three have factories located in Metro Manila (Table 1). Most of the firms have been in operation for over 10 years; five have been in operation for more than 50 years (Table 2). Most of the companies in the sample are large; twenty-four have labor complements of 200 or more (Table 3). On the average, approximately 60.36 percent of the work force are directly involved in production.

Table 1
Plant Location

Location	No.*	Percent
Metro Manila	33	72.74
Outside Metro Manila		
Luzon	13	28.26
Outside Luzon	6	13.04

* Some companies have more than one plant.

Table 2
Number of Years in Operation

Years	No.	Percent
50 and over	5	10.87
25-49	12	26.09
10-24	16	34.78
less than 10	13	28.26
Total	46	100.00

Table 3
Employment Size*

No. of Employees	No.	Percent
10-99 (Small)	10	21.74
100-199 (Medium)	12	26.09
200 and over (Large)	24	52.17
Total	46	100.00

* Based on Board of Investments (BOI) classification.

The sample includes companies in the following lines of business:

o Food and beverages	12
o Garments and allied products	11
o Semiconductors	4
o Personal care products	3
o Vehicle and vehicle parts	3
o Paper products	3
o Construction materials	3
o Agricultural products	2
o Pharmaceuticals	1
o Light bulbs	1
o Porcelain products	1
o Adhesives	1
o Foam products	1

Responses to the questionnaire have been obtained from either the person directly in charge of quality management or a high-level production personnel.

RESULTS

Definition of Quality

Academic pioneers have given the concept of quality varying but related definitions centering on two important meanings: 1) features that meet customer needs and provide customer satisfaction, and 2) freedom from deficiencies.

The definitions provided by most of the respondents are consistent with generally accepted definitions: conformance to standards and customer satisfaction (Table 4).

Only one company used the definition formulated by the International Standard Organization (ISO) which is "the totality of features and characteristics of a product or service that bear on its ability to satisfy stated or implied needs."

Some of the respondents gave definitions specific to the nature of their business. These are some examples:

"When the company speaks of 'high quality feeds' two conditions must be met, namely: what is claimed

Table 4
Definition of Quality

Definition	No.*	Percent
Conformance to standards and specifications	24	52.17
Customer satisfaction	11	23.91
Freedom from deficiencies	3	6.52
Fitness for use	2	4.35
Surpassing customer expectations	2	4.35
ISO definition	1	2.17
Definition specific to products and processes	5	10.87
Broad definition	3	6.52
Loose definition	2	4.35

*Some respondents gave multiple answers.

to be inside the package, and what the performance of the feeds would be."

"Quality implies durability of materials, workmanship, and comfort."

"Quality means no puckering in the embroidery."

"Quality in papermaking is the measure of the standard properties of the paper. For writing paper, the stock must be well beaten to produce a hard 'rattly' texture. For printing paper, the fibers should be well fibrilated. For paper board, maximum folding quality is desired. For tracing paper, pulp should be beaten to its maximum."

"Quality is in terms of the level of adhesion, tackiness, and cohesion."

Some definitions were loose, such as:

"The concept of quality is too broad to define and explain. But it is not simply workmanship."

"Quality is all-encompassing and wholistic. No single incisive and categorical definition can rim the concept."

Quality takes on a broader definition than in the customary elements of product quality in certain instances.

"Quality does not only refer to the quality of the product but also to the quality of everything that involves the company — from the employees to the merchandise to the process itself."

"Quality means improved housekeeping, punctuality, preventing losses and delays in message handling, standardizing supplies, effective office-plant communication, improved work environment, JIT raw materials."

"Quality is a total concept. This concept encompasses totality in services, products, office environment, and people."

It is also important to note that seven of the companies included in the study recognize the existence of the "internal customer," the next person in the production process or the next department. This gives quality a more comprehensive perspective, making the concept of "quality at the source" more meaningful.

Monitoring of Quality Performance

All of the respondents recognize the need to monitor the quality of raw materials, work-in-process, and finished goods, in order to ensure adherence to standards or specifications. Most of the firms included in the sample have some form of quality function, although a number of these companies did not have a specific department to handle quality assurance (Table 5). Of the latter, nine are small in terms of employment size.

Table 6 summarizes the monitoring approaches employed in the sample firms categorized by industry.

The main approach used for evaluating quality is inspection, and this is usually done by stage or process. Surveillance points, also called inspection gates are set up at critical stages in the production process to ensure that no defective units are passed on to the next stage. Since the quality of incoming raw materials or parts is crucial to product quality, 100 percent inspection is prevalent (see section on quality control procedures).

Table 5
Quality Management Function

Organizational Unit/Element Handling Quality Assurance	No.	Percent
Quality Control/Assurance Department	28	60.87
Quality Control Laboratory	1	2.17
Product Engineering Department	1	2.17
Engineering Services Department	1	2.17
Quality Control Inspectors (No QC Department)	15	32.61
Total	46	100.00

Laboratory testing is common especially among food manufacturers. The tests include chemical, physical and microbiological examinations. This also includes tests on packaging materials.

A few companies cited customer feedback as a monitoring mechanism. For most of these companies, this is considered the most significant factor in monitoring quality performance.

Among garment manufacturers, inspectors are generally employed not only to check on in-plant operations, but on subcontracted jobs as well. They are assigned to visit the subcontractor's plant to monitor the quality of the subcontracted items. Reinspection usually takes place when the items are delivered.

Companies with quality circle or similar programs also use the circles to monitor quality performance and to develop countermeasures to be applied to the process or the product in order to arrest whatever quality-related problems might arise.

Although the general impression of quality assurance among the sample firms remains conventional; that is, quality assurance is equated with quality control or inspection, a few of the companies have started to realize the necessity of adopting a policy of holding people directly involved in production responsible for the quality of the activities or items assigned to them ("quality at the source"). This is consistent with the concept of Total Quality Management or Total Quality Assurance which requires complete employee participation and commitment to quality goals.

Training for Quality

The total involvement of workers plays a vital role in quality improvement. One of the goals of TQM is to bring out the best potential from each member of the work force in order to maximize his contribution to the overall target of customer satisfaction. Miyai (1991) identifies three areas where worker factors would be critical. First, the effectiveness of production equipment can vary depending on the manner by which human resources work with them. Second, the ideal production system is one where work processes are self-managed. This can only be possible if workers are qualified enough to specify appropriate methods and procedures for production processes. Finally, in order to achieve "quality at the source," self-inspection must be in practice. This would reduce the need for quality control inspectors and probably motivate workers to improve the quality of the goods they produce.

According to Juran (1988), "there is a body of quality-related knowledge which is an essential element of modern competition in quality." He calls this body of knowledge 'quality disciplines'. These disciplines consist of major managerial concepts (fitness for use, parameters of quality, quality planning, quality assurance, quantification), tools for functional areas (sales, product development, supplier relations), inspection and testing, field performance, quality improvement, broad management of the quality function, data collection and analysis. Training in these disciplines, according to Juran, is a necessity if the impact of TQM is to be maximized. However, he cautions that training must be especially designed to meet specific company needs. Different companies face different problems and challenges. The attitudes, knowledge and skills of the work force, as well as their readiness for massive training must be carefully evaluated. The availability of training facilities and related resources should also be a major consideration.

Majority of the companies involved in the study have formal training programs in quality, although only a smaller number require their employees to undergo training in statistical and other quantitative techniques (Table 7).

Table 6
Quality Performance Monitoring

Monitoring Procedure	Food	Garments	Semicon	Personal Care	Vehicles/ Vehicle Parts	Paper	Const. Matls.	Agri. Prod.	Pharm.	Bulbs	Porce.	Adhs.	Foam
Sample Size	12	11	4	3	3	3	3	2	1	1	1	1	1
Process Studies/Testing	2	–	–	–	–	–	1	–	–	–	–	–	–
Laboratory Testing (raw materials)	9	–	1	1	–	–	1	–	1	–	–	–	1
Laboratory Testing (work–in–process/ finished goods)	10	–	–	1	1	1	–	1	1	–	–	–	–
Incoming raw materials inspection	9	10	4	3	3	2	2	2	1	1	1	1	1
In–process inspection	10	10	4	3	3	2	1	2	1	1	1	1	1
Final goods inspection	8	10	4	3	3	2	3	2	–	1	1	1	1
Customer feedback	3	–	2	1	1	–	–	1	–	1	–	–	–
Monitoring/checking of field handling and storage	1	–	–	–	–	–	–	–	–	–	–	–	–
Monitoring product design/ preproduction planning	4	1	–	1	–	–	–	–	–	–	–	–	–
Quality circles	1	1	2	1	1	–	–	1	–	–	1	–	–
Monitoring quality "at the source"	–	–	–	–	–	–	2	–	1	1	1	–	–

Table 7
Training for Quality
by Employment Size

Type of Training	Employment Size			
	Large	Medium	Small	Total
Sample Size	**24**	**12**	**10**	**46**
Formal training on quality	15	7	2	24
Technical training (functional, skills)	14	5	3	22
Training on statistical tools/ other quantitative techniques	8	2	–	10
On-the-job training	4	1	5	10
Instructions/assistance from supervisor or senior worker	3	3	8	14
Regular meetings to discuss quality issues	5	4	1	10
Performance reviews/appraisals	2	–	1	3
Quality circle training	7	1	–	8
Training abroad	3	2	–	5

Considering the different forms of training, however, it is apparent that focus is more on technical enhancement along functional lines. Training is generally on skills and tools needed to carry out the operational aspects of the job, in line with departmental functions. Good manufacturing practices (GMP) is a common topic covered in formal training, along with operational procedures, safety and industry basics. Only seven of the sample firms claim that they actually have training programs designed according to the conception of Juran. Of these firms, six are large.

In the case of smaller companies, on-the-job training and job rotation, instructions and assistance from supervisors and senior workers take the place of formal training programs.

Regular meetings and performance reviews where issues, concerns and suggestions on quality improvement are addressed also allow workers (whenever they are asked to participate) to learn and appreciate the importance of product quality.

Companies with quality circle programs conduct more intensive training, particularly in group dynamics, commitment formation, and statistical tools. For companies with Japanese tie-ups (there are two — a car manufacturer and a manufacturer of porcelain dinnerware), some of the workers, particularly the engineers, are sent to Japan for training.

Quality Control Techniques

The survey results confirm that statistical control techniques are recognized by local manufacturing companies as important tools in quality management. Tables 8 and 9 show that the use of sampling inspection (acceptance sampling) for incoming materials and finished goods, and control charts for in-process operations is not uncommon, although many of the companies, especially those in the garment industry, predominantly employ 100 percent inspection due to the rigid requirements of customers.

There are also indications that smaller firms, in con-

trast to large firms, favor 100 percent inspection for all types of items, from raw materials, to work-in-process, to final goods (Table 10). These companies claim that there is no immediate need to employ sampling procedures because of the lower volume of production.

Vendor Selection

Under TQM, vendor relationships are based on a very different philosophy compared to traditional manufacturing operations. There are two key themes behind a good vendor relationship: quality and trust. Vendors should be looked at as partners in a joint effort with the company. Supplier cooperation is necessary in order to increase the company's flexibility and improve the flow of quality materials into the production line. This means more than just timely delivery of materials.

Based on the survey, there is no evidence that local companies favor single sourcing. Except for one garment company which has only one supplier (by necessity rather than by choice), the rest of the sample firms have multiple sources for their raw materials and/or components, whereas single-sourcing or, at the least, limited-sourcing is a more likely arrangement if long-term vendor relationships are sought. Vendors are usually chosen based on their capacity to meet quality standards, prices, capability to deliver on time, and capacity to meet volume requirements (Table 11).

Table 8
Quality Control Procedures by Area of Application

Control Procedure	Prod. Design	Raw Materials	Work in Process	Finished Goods
Nonstatistical QC				
Cause-and-effect diagram	–	–	3	–
Checklist/checksheet	1	1	5	3
Statistical				
Fundamental methods				
Scatter diagram	–	–	3	–
Pareto charts	–	–	4	–
Histograms	–	–	4	1
Control charts	–	–	25	–
Process capability studies	–	–	3	–
Intermediate methods				
100% inspection	–	12	13	12
Sampling inspection (acceptance sampling)	–	26	3	27
Advanced methods				
Reliability techniques	1	–	–	1
Value engineering	1	–	–	–
Design conformity studies	–	–	1	–

Table 9
Quality Control Procedures
by Industry

Control Procedure	Food	Garments	Semicon	Pers. Care	Vehicles/ Vehicle Parts	Paper	Const. Matls.	Agri. Prod.	Pharm.	Bulbs	Porce	Adhs.	Pers. Foam
Sample Size	**12**	**11**	**4**	**3**	**3**	**3**	**3**	**3**	**1**	**1**	**1**	**1**	**1**
Nonstatistical QC													
Cause–and–effect diagram	1	1	1	–	–	–	–	–	–	–	–	–	–
Checklist/checksheet	2	1	1	–	–	–	–	–	–	–	1	–	–
Statistical													
Fundamental methods													
Scatter diagram	1	1	1	–	–	–	–	–	–	–	–	–	–
Pareto charts	1	1	1	–	–	–	–	–	–	–	1	–	–
Histograms	1	1	1	–	–	–	–	–	–	–	1	–	–
Control charts	7	2	4	1	3	–	1	2	1	1	1	1	1
Process capability studies	1	–	2	–	–	–	–	–	–	–	–	–	–
Intermediate methods													
100% inspection	–	8	–	1	–	1	2	–	–	–	–	–	1
Sampling inspection (acceptance sampling)	10	3	2	3	2	–	1	2	1	1	–	1	1
Advanced methods													
Reliability techniques	1	–	–	–	–	–	–	–	–	–	–	–	–
Value engineering	1	–	–	–	–	–	–	–	–	–	–	–	–
Design conformity studies	–	–	1	–	–	–	–	–	–	–	–	–	–

Table 10
Quality Control Procedures
by Employment Size

Control Procedure	Employment Size Large	Medium	Small	Total
Sample Size	**24**	**12**	**10**	**46**
Nonstatistical QC				
Cause-and-effect diagram	2	1	–	3
Checklist/checksheet	4	1	–	5
Statistical				
Fundamental methods				
Scatter diagram	2	1	–	3
Pareto charts	3	1	–	3
Histograms	4	–	–	4
Control charts	19	4	2	24
Process capability studies	3	–	–	3
Intermediate methods				
100% inspection	–	6	7	13
Sampling inspection (acceptance sampling)	18	6	3	27
Advanced methods				
Reliability techniques	1	–	–	1
Value engineering	1	–	–	1
Design conformity studies	–	–	1	1

Only nine of the 46 companies have comprehensive vendor accreditation programs designed to generate long-term relationships with suppliers. All of these companies are large, with no particular industry concentration.

Substandard Products

To assure quality performance, defects must not be allowed or must be corrected immediately when detected. Based on the results of the survey, there seems to be strong agreement as to the way substandard or nonconforming products should be handled.

Table 12 enumerates the courses of action taken by the sample companies whenever items below specified standards are encountered or produced.

Substandard products are generally treated on a case to case basis depending on the seriousness of the defects. They are usually classified as minor, major, or critical. Minor defects are those which may not affect the overall characteristic of the product and can still be remedied. Major defects are those which cannot be remedied by repair or minor adjustment but have some salvage value. Critical defects are those which are beyond salvage, hazardous, unsafe or damaging to the company's image.

Minor defects are usually adjusted, reworked, or repaired, as in the case of a wrong label on a container of ice cream, or a slightly uneven stitch on a piece of garment.

Major defects may be remixed, recycled, reblended, or reprocessed. Oversized, undersized or misshaped candies

Table 11
Vendor Selection Criteria
by Employment Size

Selection Criterion	Employment Size Large	Medium	Small	Total
Sample Size	**24**	**12**	**10**	**46**
Capacity to meet quality standards (including quality of raw materials)	19	8	7	34
Prices	7	6	2	15
Capacity to deliver on time/ reliability of lead time	5	6	4	15
Capacity to meet volume requirements/plant capacity	7	--	2	9
Company background (reputation, integrity)	3	--	2	5
Terms of payment	--	--	3	3
Financial stability	2	--	1	3

are ground again and subjected to the whole process. If cement is found below the specification, it is segregated at one cement silo and blended again in small proportions with high quality cement from other silos. Some companies reclassify the substandard products and sell them as discounted items or "seconds." Defective paper products are converted into Class B items like envelopes, newsprint, mimeograph paper, table napkins, and tissue paper. Substandard mattresses are sold as discounted products. For items which cannot be recycled into salable products, they may be used as input material for further processing. For instance, adhesives that do not pass quality control can be used as paste or glue.

Critical defects are scrapped, condemned, thrown away, burned or destroyed. Candies whose particles have already crystallized are melted into liquid and thrown away. Garments beyond salvage are stripped down, and materials which could be reused are kept for future use.

The Cost of Quality

Juran (1991) equates quality costs with the cost of poor quality, and summarizes these costs into four categories: internal failure costs, external failure costs, appraisal costs, and the cost of prevention. Internal failure costs include scrappage, rework, failure analysis, reinspection and retest, avoidable process losses, and downgrading. External failure costs include warranty charges, complaint adjustment, returned materials, and allowances. Appraisal costs include incoming inspection, in-process inspection and test, final inspection, product quality audit, maintenance of testing equipment, and evaluation of stock. Cost of prevention includes the cost of quality planning, product review, process planning, process control, quality audits, supplier quality evaluation, and training.

Except for a few companies (10 of the 46 participating firms) which do not recognize the importance of ascertaining the cost of quality assurance or have no way of determining it, the firms included in the sample seem to agree with Juran's definition of quality costs, although there is no clear indication that this information is being used in order to attain the goals of TQM. There should be a conscious effort to cut down the cost of quality assurance, at least as regards the elements associated with internal and external failure. With better vendor relationships and im-

Table 12
Treatment of Substandard Products by Industry

Control Procedure	Food	Garments	Semicon	Pers. Care	Vehicles/ Vehicle Parts	Paper	Const. Matls.	Agri. Prod.	Pharm.	Bulbs	Porce	Adhs.	Pers. Foam
Sample Size	**12**	**11**	**4**	**3**	**3**	**3**	**3**	**2**	**1**	**1**	**1**	**1**	**1**
Reprocessed (reworked, recycled, adjusted, repaired)	11	9	4	2	2	1	3	1	–	–	–	–	–
Scrapped (burned, thrown away, sold as scrap material)	10	3	3	1	3	–	2	–	–	1	–	1	–
Reclassified as "seconds"													
Sold at lower price to customers (usually unbranded)	2	7	–	–	–	1	–	1	–	–	1	–	–
sold to employees	1	1	–	–	–	–	–	–	–	–	–	–	–
Allowed to go through the next process	–	–	2	1	–	–	–	–	–	–	–	–	–
Stripped down and reused for other purposes	1	1	–	2	–	–	–	–	–	–	–	1	–

proved production processes, appraisal costs should also be minimized. The only component of quality cost which seems to be justified is cost of prevention.

CONCLUSIONS

With increased competition and better educated consumers, TQM has become a strategy for survival, and manufacturing companies in the Philippines are cognizant of this fact. Results of the survey confirm this. Although conclusions from the study could only be tentative because of the small sample size, there are clear indications that local manufacturing firms have started moving towards the direction of TQM. In general, their conception of quality is consistent with those of academic experts in the field of quality management. They are aware of the linkage among the elements that make up the TQM program — quality inputs, worker competence and involvement, quality products, and customer satisfaction. Some of the firms have actually launched TQM-related programs such as quality circles, employee suggestion programs, and productivity improvement teams. However, most of the quality management methods used remain traditional and require some degree of reorientation. On the other hand, as long as there is recognition of the need to deliver total quality, and the initiative to attain this goal, we may in all probability see the realization of a World Class Philippines.

REFERENCES

Diminnie, Carol B., "What Really is Going on in Quality Control?" **Production and Inventory Management Journal**, Fourth Quarter, 1989, 16-18.

Juran, J.M., ed. **Juran's Quality Control Handbook**. New York: McGraw-Hill, 1988.

Kaufman, Roger, "The Challenge of Total Quality Management in Education," **International Journal of Educational Reform**, Vol.1, No.2, April 1992, 149-165.

Miyai, Jinnosuke, "Quality and Productivity - Imperatives for Survival," **Quality and Productivity: Imperatives for Survival**, 10th National Productivity Congress, 1991, 1-12.

Modarress, Batoul and Ansari, A., "Quality Control Techniques in U.S. Firms: A Survey," **Production and Inventory Management Journal**, Second Quarter, 1989, 58-62.

EXHIBIT 1

University of the Philippines
College of Business Administration

BUSINESS ADMINISTRATION DEPARTMENT

SURVEY OF MANUFACTURING COMPANIES
ON QUALITY MANAGEMENT

Name of Company _____
Address _____

Number of Years in Operation _____
Total Number of Employees _____
Number of Employees involved in Production _____

Major Product(s)/Product Line(s)

_____
_____

Name of Respondent _____
Position _____

1. How do you define quality?

_____
_____

2. How do you monitor quality as defined above?

_____
_____

3. How do you train employees in quality control techniques or convey to them the importance of quality?

_____
_____

4. Do you use statistical quality control techniques?

_____
_____

5. How do you select vendors?

_____
_____

6. What do you do with substandard products found during quality checks?

_____
_____

7. How do you determine the costs of quality assurance?

_____
_____