



Adopting TQM approach to achieve customer satisfaction

A flour milling company case study

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Abstract

Purpose – The purpose of this paper is to present the results of a survey of customer satisfaction with regard to the strategy of total quality management (TQM) adopted in a wheat flour milling company.

Design/methodology/approach – A survey was conducted to learn more about customer expectations and satisfaction. The respondents were all customers of a flour-based food processor. Quality function deployment (QFD) was applied to improve customer service performance by focusing on customer satisfaction, value and retention.

Findings – The results show that customer satisfaction has increased steadily over a period of three years. The QFD approach helped to design a competitive product by aligning the company resources to customers' needs.

Research limitations/implications – The findings are limited to a specific food manufacturing company and for this reason they cannot be generalized to the whole in service sector. Further research is needed for other service companies.

Practical implications – The findings may support manufacturing companies hoping to achieve customer satisfaction by focusing on TQM implementation efforts. Furthermore, companies can focus their efforts on improving the way in which they meet certain customers' needs if these needs are more extensively related to a certain component of quality management.

Originality/value – The paper presents evidence to managers of the value of implementing TQM strategy to effectively achieve customer satisfaction that ultimately leads to greater market share and profit maximization.

Keywords Manufacturing industries, Food industry, Total quality management, Quality function deployment, Customer satisfaction, Benchmarking

Paper type Research paper

1. Introduction

Over the past two decades, companies have been experiencing dramatic changes in the business environment characterized by such phenomena as increasing consumer awareness of quality, the rapid transfer of technology, globalization and competition to reduce costs. In response to these challenges, many companies have joined the quality faction and implemented various quality improvement initiatives as a means to enhance competitiveness and ultimately business performance. While the business world also shifts its focus from product to customer, managers are discovering that profitable and sustainable revenue growth results from enhanced customer relations (CR), because consumers nowadays are more informed, more demanding, and prone to change brands and companies if their requirements are not met on time and at a price they are willing to pay (Andronikidis *et al.*, 2009).



However, quality is considered the ability to meet the stated and implied requirements of customers and not an inherent feature (Shahin and Nikneshan, 2008). The effectiveness of quality initiatives resulting in sustainable competitive advantage and enhanced business performance has been a major subject of interest for business (Arumugam *et al.*, 2009). Understanding customers' expectations is a prerequisite for delivering superior products, because they represent the implicit performance standards which customers use in assessing product quality (Parasuraman, 1998). Total quality management (TQM), as a set of management practices, focusing on customer satisfaction and constant organizational development, has been widely adopted (Dale, 1999; Yusof and Aspinwall, 2000).

Through TQM practices, companies have been trying to improve product quality to earn customer satisfaction, besides their overall performance (Bhat and Rajashekhar, 2009). But an image of the kind of TQM strategy, which will efficiently earn this satisfaction in manufacturing industry, is still vaguely presented. Most companies naturally focus on improving the quality of the product, while service quality – the steps taken to deliver the product – is not generally given priority. Thus, it is helpful for companies to know and understand the current practices and opportunities offered by TQM if they want to pursue customer satisfaction by combining improvements in the product with those in the quality of service.

To provide a comprehensible image of TQM strategy in a manufacturing company, the present study collects data from a "Voice of the Customer" survey, which describes how customers (in this case, of a small to medium-sized enterprise – hereafter, SME – in the food industry, processing wheat flour) appreciate quality in products and services. The main research question of this paper is as follows:

- How TQM can be implemented to achieve customer satisfaction in terms of quality of products and services?

The data are analyzed by the QFD method to gauge the level of customer satisfaction with products and service and to establish action plans for developing the potential of both. QFD is chosen since it is a form of strategic planning to accomplish TQM and is essential for quality initiatives to be successful (Juran, 1989).

In the light of the above, this paper is structured as follows. Section 2 reviews the theories laid down in the studies of customer satisfaction, with special reference to the case under review. Section 3 presents quality and TQM concepts by discussing the TQM implementation programme in the case company. Section 4 provides a snapshot of the analysis and measurement process of TQM success in the case company. Finally, Section 5 is devoted to conclusions and implications.

2. Customer satisfaction

2.1 *Defining customer value and satisfaction*

Customers choose products or services from a selection of different kinds on the basis of pre-perceived value for the product. Value can be defined as a ratio between what the customer gets and what he gives. The customers get benefits and assume costs. The benefits include functional benefits and emotional benefits. The costs include monetary costs, time costs, energy costs and physics costs. Thus value is given by:

$$\text{Value} = \frac{\text{Benefits}}{\text{Costs}} = \frac{\text{Functional benefits} + \text{emotional benefits}}{\text{Monetary costs} + \text{time costs} + \text{energy costs} + \text{psychic costs}}$$

During and after the consumption and use of a product or service, customers will develop feelings of satisfaction or dissatisfaction (Kotler and Armstrong, 1996; Kotler, 2000). Customer (dis)satisfaction is defined as the overall attitude of customers towards a good or service after they have acquired and used it. It is a post-choice evaluation which results from selecting a specific purchase and the experience of using/consuming it (Malhotra, 1999). From the managerial perspective, maintaining and/or enhancing satisfaction is critical. Most studies reveal that satisfied customers positively influence a company's future cash flows (Pande *et al.*, 2000). Managers should therefore in their overall business process create programmes to increase customer satisfaction.

However, it is necessary to recognize the factors which contribute to customer satisfaction or dissatisfaction. Figure 1 presents a model of customer satisfaction with regard to their consumption/use of product or service. On the basis of this experience, they evaluate its overall performance. This action has been found to relate precisely to the ratings of quality of product and/or service. Customers compare their perceptions of product/service quality after using the product with their expectation before they purchase it. It also depends on how far actual performance reflects expected performance; customers may experience positive, negative or neutral emotions. These emotional responses act as inputs into their overall satisfaction/dissatisfaction perception.

The level of satisfaction/dissatisfaction will also be affected by customers' evaluation of the equity of the exchange and also by their attributions of the cause of the product's performance.

3. Implementing TQM

3.1 Quality and TQM

Different specialists have defined quality as "fitness for use", "conformance to requirements" and "freedom from variation". One further short definition of quality is

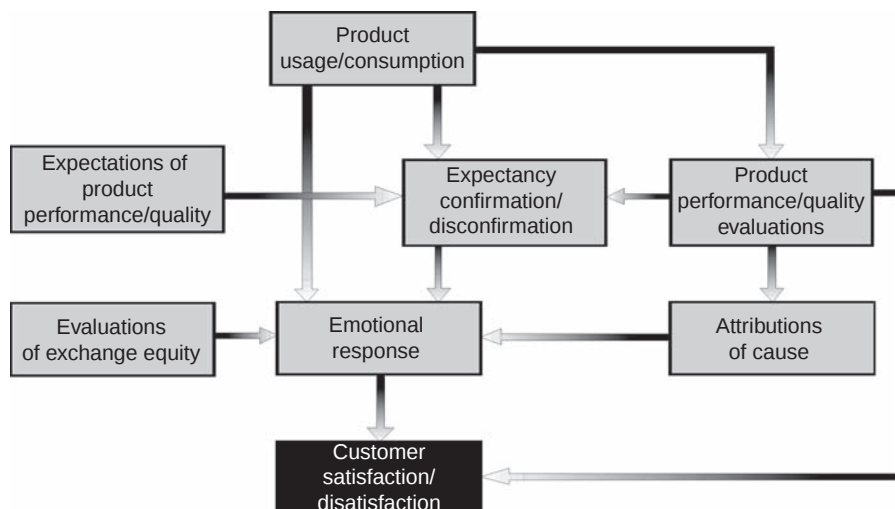


Figure 1.
A model of customer satisfaction/dissatisfaction

also “customer satisfaction and loyalty”. We use two definitions of quality, for either products or services, as follows:

- “The totality of features and characteristics of a product or service that bear on its ability to satisfy stated or implied customers’ needs” (Kotler, 2000).
- Quality must provide goods and services that completely satisfy the needs of both internal and external customers. Quality serves as the “bridge” between the producer of goods or services and the customer (Johnson and Weinstein, 2004).

Quality is the key to value creation and customer satisfaction. In a quality-centred company, a marketing manager has two responsibilities. First, he should participate in formulating strategies and policies designed to help the company win through the excellence of its quality. Second, he should deliver marketing quality alongside production quality. Each marketing activity – market research, sales training, advertising, customer service, and so on – must be performed to high standards. Marketers play several roles in helping their companies to define and deliver high-quality products and services to its target customers.

TQM is basically a strategy (towards continuous change), as well as an operationalized process, and can be also described as a holistic approach which seeks, through the improvement of quality, productivity and competitiveness (Pfau, 1989), to integrate all organizational functions and organizational objectives in a focus on meeting customer needs (Kumar *et al.*, 2008). It emphasizes the role of internal and external customers and suppliers, and the involvement of employees in a quest for continuous improvement (Oakland *et al.*, 2002; Kanji, 2002; Karia and Asaari, 2006; Chang, 2006). TQM allows firms to obtain, on the one hand, a high degree of differentiation, satisfying customers’ needs and strengthening brand image, and, on the other, to reduce costs by preventing mistakes and wasted time and by making improvements in the corporation’s processes (Conca *et al.*, 2004). It encompasses and facilitates all functional areas, processes and systems of businesses, including design, development, production, distribution and customer support (Jung *et al.*, 2008). This holistic approach aims to maximize customer satisfaction upon a basis of repeating activities in the interests of innovation and advancement (Dessler, 2003; Ross, 1998; Yang, 2005).

According to Gill (2009), quality in a product makes sure that it can meet the present expectations of the customer takes account of or incorporates future needs. Indeed, the implementation of quality is the main focus in TQM philosophy. However, TQM companies need to define quality for themselves, whether the definition is intended to meet engineering standards, or is a leading edge definition to make a product which animates customers and which customers would not think of buying from competitors. With a clear definition of quality the company can start to focus on a target for change but if no one agrees on the definition of quality it is difficult to focus on implementing changes which will improve quality.

3.2 *Scope of quality management*

According to Klefsjö *et al.* (2008), the scope of quality management has changed in recent years from “customer satisfaction” to something broader. This trend may be due to companies’ increasing focus on their multiple bottom lines. What is vital is the way in which companies decide to define the concepts of customers, non-customer stakeholders and interested parties.

Bergman and Klefsjö (2003) describe customers broadly as “those companies want to create value for”. The notion of value is here related to value chains, not to the financial chains in the organization. A transitional definition which may be constructive is that customers are individuals or organizations further downstream in the product life cycle process, that is, they are the receivers of a product (Johansson, 2008). Individuals or organizations upstream in the same process would accordingly be named suppliers. Customers and suppliers can be internal or external, depending on the organizational boundaries of the actual process.

Freeman and Reed attach the term “stakeholders” with those persons or groups that have stakes in the organization. Klefsjö *et al.* (2008) think stakeholders are those actors that provide necessary means or support to the organization, which could be withdrawn if their wants or expectations are not met. They further suggest the term “primary stakeholder” to be used for those actors who provide the necessary means or support for the organization and could withdraw these, leading to significant consequences for the organization. Examples of primary stakeholders could include customers, employees, investors, shareholders and government.

According to Klefsjö *et al.* (2008) “interested parties” are those who have any interest in the organizational activities, output or outcome, although these parties lack power or instruments to create unacceptable damage for the organization or to influence the primary stakeholders to do so. Some actors, although not directly providing any of the necessary means or support to the organization, may still have enough influence to justify considering them more than mere interested parties. Those “secondary stakeholders” may include non-governmental organizations, academics, media, fair-trade bodies, environmental pressure groups and other individuals or organizations which somehow may manipulate stakeholders to act on their behalf, if their needs and expectations are ignored.

3.3 Implementing TQM for customer satisfaction

What should marketers do in order to raise customer satisfaction and ultimately improve company performance? In the course of the improvement period, they should address it from two sides:

- (1) Product quality side: developing quality management systems, implementing International Standard Organization, implementing supplier evaluation programmes (in this case, as a provider of wheat and packaging materials and additive material) and providing food safety assurance through health certification.
- (2) Services side: providing a training centre for food processing, allocating technical representatives for after-sales services, running promotion activities and hotline services to develop customer relationships developing business information for sales and distribution by using the ERP system for online customer orders, payment systems, production planning and scheduling and connecting R&D to customers in order to meet specific customer wants.

3.3.1 Measuring customer value and satisfaction. Quality function deployment (QFD) is used to assess the quality of products and services from the customer’s standpoint and to identify the prioritized items of product quality and service which can affect the improvement of the SME and also to plan designs for products and services which give high advantage to both the customer and the company (Besterfield and Besterfield,

1994; Cohen, 1995) by creating product uniqueness and shortening product life (Urban and Hauser, 1993).

QFD is defined as “how we understand the quality that our customers expect and make it happen in a dynamic way” (Martins and Aspinwall, 2001; Chow-Chua and Komaran, 2002). QFD is also referred to as a “house of quality” (HOQ). The logic behind this is that the matrix in QFD fits together to form a house-shaped diagram (Kutucuoglu *et al.*, 2001). QFD involves a team of people representing the various functional departments which combine in product development, such as marketing, design engineering, quality assurance (QA), manufacturing/manufacturing engineering, test engineering, finance, product support, etc. (Crow, 1996). Figure 2 shows how QFD is used to benchmark organization technical capabilities against customer requirements. It shows that continuous improvement is the basic need for implementing QFD through the HOQ.

3.3.2 Customer satisfaction survey 2006. Observations were made of the case under review, a manufacturing company which is classified as an SME. Its main products are three classes of wheat flour products (high, medium and low protein content), divided into 16 brands with additional products, such as pellets, bran and pollard. We observed only wheat flour, since it accounts for 85 per cent of the total sales. In addition, pellets, bran and pollard are consumed by the cattle and wood industries and are thus not as sensitive as those for the wheat flour customers. The product quality and customer service of the company were observed together with those of its three local competitors and of the imported flour distributed in the market and the views of 150 customers were gathered; they bought various products (bread, noodles, biscuits, cakes, spring rolls, pastry and fried snacks). Sales regions and weekly consumption totals were also examined.

The observation was not concerned with the matter of product price. Surveys were conducted in 2006 and again in 2008.

Due to the low education levels of SME operators, the method was used of in-depth interviewing, on the recommendation of Churchill (1999), who suggests that this method is best suited to theory generation, in that in-depth interviewing allows the interviewer to change the wording of questions in accordance with the “universe of discourse” (Gorden, 1975), jargon and contextually specific phraseology and terminology of the informant.

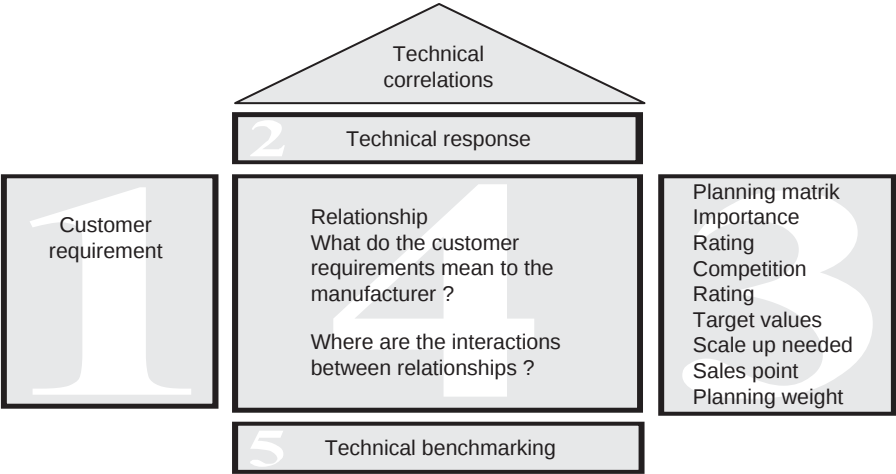


Figure 2.
HOQ for implementing
QFD

The company used QFD for defining customer requirements (what), defining the technical correlation between customer requirements and technical response (how), planning the next improvement to meet customers' views and then defining which customer requirements should be prioritized, bearing in mind the manufacturing capability of the company. The following sections detail the steps of this process.

Defining "what" the customer requirements are (Step 1 in Figure 3). Referring to customer value, functional benefits are defined as product quality attributes and emotional benefits are defined as service attributes. Table I presents both the product quality and service attributes that customers want (what).

Table I was prepared by the marketing department of the company together with the product development section. The information was gathered in the course of discussion sessions. All the criteria in Table I are currently applied in the factory, marketing department and also in customer relationship management (CRM). Every Monday for three months the department heads of these sections held a management review meeting (MRM) convened by that was facilitated by the QA department to formulate customer requirements. In addition, a quality consultant was also invited, whose job was to guide the managers in formulating these requirements through training and in-depth interviews.

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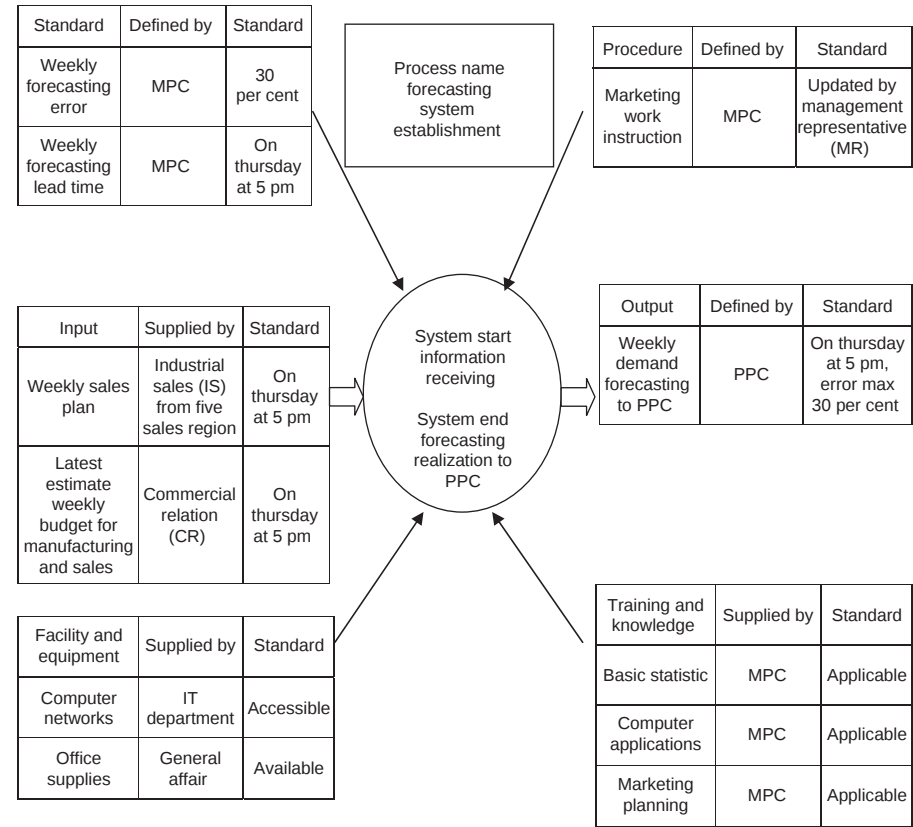


Figure 3.
Process model sheet for
meeting product
availability requirement
with manufacturer's
capability

Table I.
Customer requirements
based on product quality
and service quality

Product quality	Service	
Flour quality	Product variety Moisture Colour Smoothness Consistency Foreign material (metal, plastic, yarn) Brown spot Product clump Insect	Handling of customer complaints Product availability Product information Assistance Sales promotion Prize, bonuses and rewards
Hazard protection	Unpleasant odour Variety of weights Stacking ability Leak proof packaging Leak proof sewing Imitation proof Accuracy of weight Halal Healthy International standard Additive materials Vitamin	Ease of calling Responses Solutions Anytime product taking Reachable stations Ease of ordering Delivery in place Ease of getting information Production code Brochure Training/exercise Partnership Entrepreneur consultancy Sample product Cookery contests Cookery demos Advertising Joint exhibitions Discounts Prizes Rewards Credit terms and payment periods 22 requirements
Flour packaging		
Flour safety and quality warranties		
Fortification		
Total	21 requirements	Total

Defining the technical correlation of “how” to meet the requirements (Step 2 in Figure 2). Once the customer requirements (22 requirements for service quality and 21 requirements for product quality) are listed (Table I), the company should deploy the requirements into an action plan. Thus, a quantitative target should be established so that all the manufacturing, marketing and product development departments can carry out the plan. The company used a questionnaire for developing the action plan, containing 18 questions to cover product and service quality. Since the customers are not familiar with the Likert scale the salespersons of the company interviewed the customers and then interpreted the customers’ answers in terms of the Likert scale.

The customers were asked how important the following needs were to them:

- (1) You need product information from a salesperson.
- (2) You need a loan facility from the company.
- (3) You need technical support for your production process related to the quality of the wheat flour.
- (4) You need a quick response with delivery lead-time of one day at maximum.
- (5) You need a quick response with delivery lead-time of one week at maximum.
- (6) You need a transportation facility from the wheat flour manufacturer.
- (7) You need direct access to the company’s CRM.
- (8) You need online purchasing.
- (9) You need wheat flour with low ash content for your product.
- (10) You need finely milled wheat flour for your product.
- (11) You need wheat flour with neutral acidity of for your product.
- (12) You are concerned about the protein content of the wheat flour used in your product.
- (13) You are concerned about the fewer choices of wheat flours for your product.
- (14) You need customized packaging of the wheat flour for your product.
- (15) You need multi-purpose wheat flour for your product.
- (16) You need wheat flour for your product which has been stored longer.

The answers to all these questions were scaled on a Likert scale from not very important, not important, fairly important and important to very important. The technical requirements arising from these answers guide a company in responding to customer wants and needs.

Developing a planning matrix and building relationships between customer requirements and the company action plan (Steps 3 and 4). One of the important outcomes of the MRM was that a process model sheet replaced the analytical hierarchy process which had always been used before in QFD implementation. This is because the company wanted to introduce a planning matrix of the simplest kind, to avoid confusion among the managers. In addition, the resulting technical response was meant to satisfy customer requirements; it had to be measurable and global in nature because it represents all the stakeholders of the quality attribute.

The first step is to construct a planning matrix. To take the example of product availability, we see from Figure 2 in the input/output analysis of the planning matrix, that resources (facility and equipment, training and knowledge, quality standards, working instruction and work plan) are benchmarked against customer requirements in the output matrix.

The company applies the process model sheet to determine and issue its technical response.

Figure 3 develops Step 4 for product availability (how); we see that the stakeholders in this step are the departments of production planning control (PPC), marketing planning control (MPC), information technology (IT) and the suppliers. The marketing department gathers information from the customers, which is then translated by the MPC according to its attributes. MPC then communicates the list of customer wants to the PPC in order to with the help of IT.

Making a development planning matrix (Step 3 in Figure 2) and prioritizing actions and finding the relationship of the matrix to the manufacturing strategy (Step 4 in Figure 2) are the result of a root cause analysis (Figure 3) and the development of action plans (Figure 4). These action plans are applied in the company where their effectiveness is periodically evaluated. This effectiveness will be the performance indicator of the success of QFD.

Figure 4 shows the operability of root cause analysis by using a fish bone diagram. The company broke down the product availability problem into four areas, namely, facility and equipment problems, system and procedure problems, information flow problems and a resources (knowledge and practices) problem. From the price of non-conformance (PONC) analysis, the company found that the biggest losses came from the knowledge sharing problem, which meant that lack of knowledge cost as much as US\$ 20.987 per week. This loss came from, for instance, back orders, cancelled contracts, etc. From this analysis, the company created an action plan, as shown in Table II.

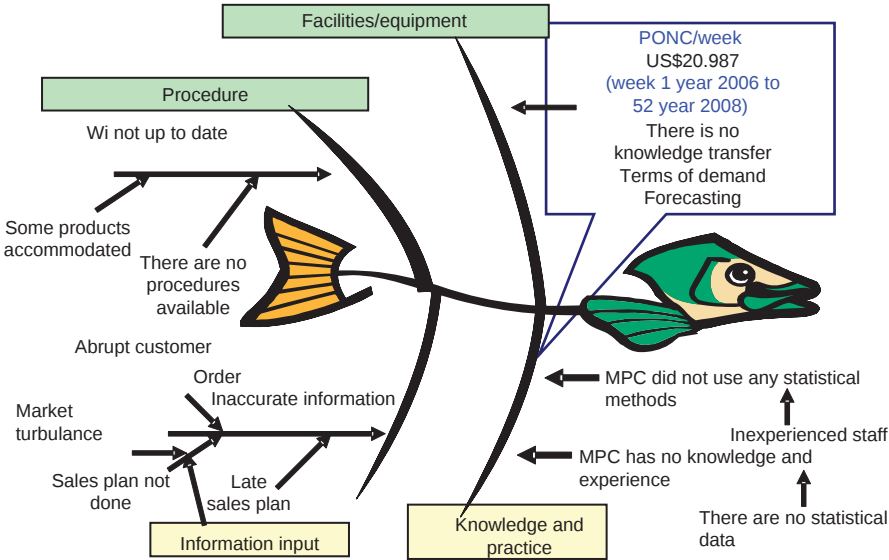


Figure 4.
Root cause analysis of delivery lateness due to loss of product availability which incurs a PONC as high as US\$20.987 per week

Table II reveals the action plan of the stakeholders in the company. For instance, the sales plan must be communicated between CR and MPC. The results of these action plans are then used in the customer satisfaction result in 2006, as shown in Section 3.3.3.

3.3.3 Customer satisfaction result 2006. After getting the result of the customer satisfaction survey, the data were plotted on the graph. Figures 5 and 6 present the customer satisfaction rate, showing customer perceptions of product quality and service. This assessment compares the company's performance against that of its competitors (local and foreign).

The satisfaction index measures customer satisfaction in relation to requirements, as in Table I. During 2006, 200 questionnaires were distributed to customers in order to observe their satisfaction with the items in Table I. The company used the same Likert scale, ranging between very weak, weak, fairly strong, strong and very strong.

What	Why	How	When	Where	Who
Statistical method	To produce good approximation of customer demand	By finding the most appropriate model	Early March 2006	MPC	MPC analyst
Working standard	To work properly	By following ISO 9000 requirement	Early March 2006	MPC	MPC section head
Sales plan	The current sales plan was not working due to product proliferation is not considered	Building communication between CR and MPC	Early March 2006	CR and MPC	CR and MPC section heads
Practices and knowledge	To empower MPC worker in making forecasting	Training and discussing	Early March 2006	MPC	MPC section head

Table II.
Action plans for
accomplishing QFD

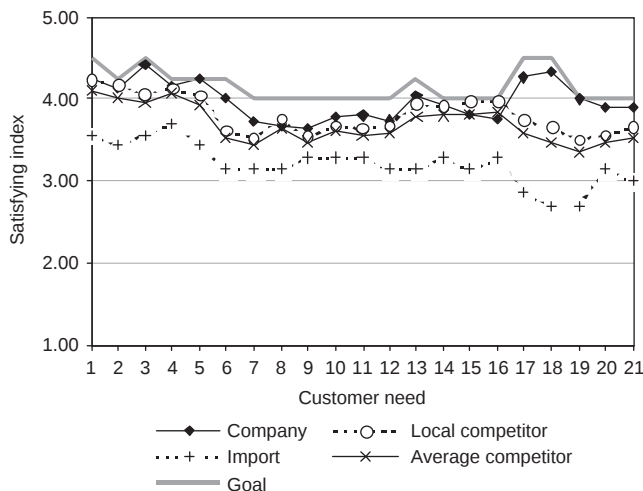


Figure 5.
Results of customer
satisfaction survey:
product quality

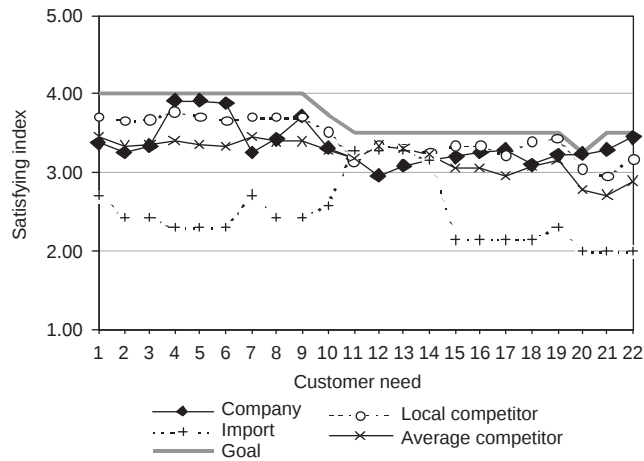


Figure 6.
Results of customer
satisfaction survey:
service quality

The results of the above figures may be summarized as follows:

- (1) Customers give a high degree of importance to product quality (3.2-4.5). The results imply that the company has been a market leader in terms of product quality and needs only to keep its positioning strategy and continuously improve its quality to attain its goal.
- (2) Customers give a moderate level of importance to service quality (3.0-3.9). The results imply, however, that the company has been a market follower in terms of service quality and needs to continuously improve its service quality to attain its goal.
- (3) Comparing the organization's performance with that of its competitors suggests that:
 - Generally, the company's performance in product quality is better than its competitors.
 - In most areas the company's performance in terms of service is inferior to its competitors.
- (4) The benchmarking of performance between the case under review and other food manufacturing companies in the world shows that serious work must be done to improve its production process and cleaning standards. In most of these areas, the company lags behind its competitors. This means that a better system must be implemented and also more professional employees should be recruited to bring the company's flourmills to the benchmarked level.

This benchmarking encourages the company to apply TQM so as to improve its product and service quality. For the first action plan, the company prioritizes its top ten attributes as the most important attributes, as follows:

- Product quality side: quality control/QA, implementation of quality and food safety international standard, wheat provider, packaging material, added iron and vitamins, health certification.

- Services side: training centre technical representative, promotion activities, sales and distribution, depots, hotline service, quality control/QA, payment system, production code and R&D.

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The reason for focusing on the top ten priorities is that the company wants to cover improvement in terms of the importance of these attributes to the customers at the point of sale and also give the most benefit to the company.

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4. Analysis and measuring the success of TQM

Designing and implementing an effective performance measurement system in the TQM context is, however, not a straightforward task and numerous authors have tried to provide guidelines and recommendations for firms adopting TQM. Kaplan and Norton (2001) state that an effective performance measurement system should provide timely, accurate feedback on the efficiency and effectiveness of operations. To be effective, a performance measurement system must therefore be based on the drivers of organizational success, which in the context of TQM include, among other things, customer satisfaction and social impact (Claver *et al.*, 2003). The long-term goals of TQM performance measurement should include the continuous improvement of performance and maximization of customer satisfaction by adapting to change in customer requirements and the general business environment. The implementation of performance measurement in the context of TQM depends on many factors: leadership, quality planning, specialized training, supplier management, process management and continuous improvement, as well as organizational learning (Claver *et al.*, 2003).

Despite the vast amount of research on performance measurement in the TQM context, there is still a lack of empirical research seeking to discover what performance measures are actually being used by those who adopt TQM and how appropriate these companies find them. In order to bridge the gap properly, this study investigates the extent of use and appropriateness of the performance measurement systems applied in the TQM context within the domains of customer satisfaction and quality of products and services in food manufacturing SMEs.

The company measures the performance indicators to observe TQM's effectiveness from 2006 to 2008, as shown in Table III. The second QFD is then developed to measure the effectiveness of the TQM programmes. The benchmarking results of the previous QFD (see Figure 5, a root cause analysis) are then used as inputs to the technical correlations of the new QFD. A new customer survey is then conducted in 2008 in order to measure the fitness of the TQM programme to the new customer survey results. The results are then summarized as shown in Figures 7 and 8.

The improvement ratio for product quality has a lower value (1-1.097), its mean company performance being very close to customer needs. Incidentally, the company needs to be serious about its performance in the matter of its services, because the improvement ratio for service is high in value.

Flour producer	Product quality			Service quality		
	2008	2006	Growth (%)	2008	2006	Growth (%)
Company	3.87	3.98	-2.71	3.46	3.35	3.29
Local competitors	3.71	3.81	-2.79	3.12	3.45	-9.41
Foreign competitors	3.21	3.21	0.00	2.47	2.47	0.00
Average competitors	3.61	4.15	-2.31	2.96	3.20	-7.59

Table III.
Index growth of customer satisfaction with the company and its competitors between 2006 and 2008

Figure 7.
Results of customer
satisfaction survey:
product quality

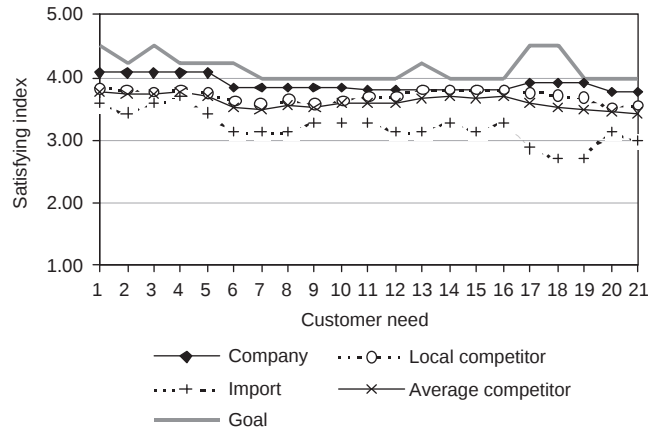
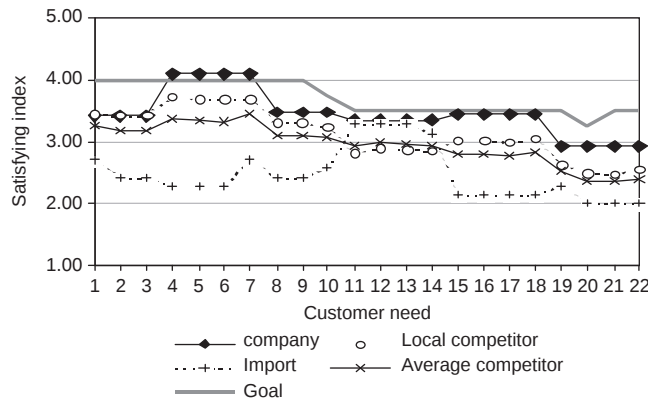


Figure 8.
Results of customer
satisfaction survey:
service quality



4.1 Comparison of the company's performance in 2006 and in 2008 (product quality)
Based on the above comparison of customer satisfaction, the customer satisfaction index for product quality in 2008 is in general lower than in 2006. Some aspects, which have been successfully improved can be seen in points 7 (brown spots), 8 (product clumping), 9 (insects), 10 (unpleasant odour) and 16 (weight accuracy), but it has not yet reached its goal yet (Table I). The company finally applied housekeeping and implemented good manufacturing practices for the food industry by considering that most of the unmet criteria fell under the heading of product cleanliness.

4.2 Comparison of the company's performance with that of its competitors in 2008 (product quality)
Generally, the company's performance was better than those of its competitors (whether for local or imported flour).

4.3 Comparison of company's performance in 2006 and in 2008 (service quality)
According to the above comparison of customer satisfaction, the customer satisfaction index for service quality in 2008 is generally higher than 2006, but it has not reached the designated goal in every component. Only four components succeeded as points 4

(anytime product taking), 5 (reachable station), 6 (ease of ordering) and 7 (delivery in place); other aspects, which need to be improved are points 9 (production code), 19 (discount), 20 (prize), 21 (rewards) and 22 (credit terms and payment period). The company finally improved their logistics networks by making contact with more autonomous distributors and attracting them by the offer of more rewards and quantity discounts.

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4.4 Comparison of company's performance with that of its competitors in 2008 (service quality)

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Generally, the company's performance is higher than those of its competitors (whether local or imported flour).

Table III shows that significant improvements were made in terms of company service quality (3.29 per cent). However, product quality went down. This reduction in product quality level is caused by the commitment of the local government to implementing the hazard analysis and critical control point (HACCP) as a food safety standard. Thus this product quality reduction is not caused by inferior process performance. Indeed, the company has increased its product quality standard by adopting the HACCP standard.

4.5 Customer satisfaction index growth analysis

Referring to Table III, the index growth of customer satisfaction indicates a shifting of customers' perception of the flour produced by the company and by its competitors. A shift in customer perception is shown in the decline of the customer satisfaction index of product quality against a rise in the customer satisfaction index of service. In this case, it is revealed in the perception of quality in the flour produced by the company. This may have been influenced by any of the following factors:

- management commitment and policy;
- continual improvement in technology and innovation; and
- management of the supply chain from supplier to end user.

5. Conclusion

Most successful manufacturing companies have embraced TQM and realized its invaluable contribution. This acknowledges the importance of TQM as an effective method of achieving excellence in manufacturing, which cannot be denied. Embracing the concept of manufacturing excellence is considered a route to becoming the best manufacturer of a certain product. It refers to the ultimate goal of achieving the best manufacturing capabilities or being best –in class in performance. Because of the pervasive use and reliance on business systems today, effective TQM strategy is much in demand to deal with all the activities of a company. The present paper brings together information from diverse sources to offer a common starting point and information base for QA professionals. A comparison of customer satisfaction with product and service can help these professionals to apply this alternative method and tailor it to or integrate it in specific applications.

A continuous QFD needs to be deployed at the lowest level of operations. In addition, in order to make TQM work efficiently, companies need to build a corporate culture to replace continuous QFD. When this is applied, it should encourage people to apply the quality improvement programme more proactively. This shortens the life cycle of analysis between one QFD and another and the company becomes more competitive due to the increasing speed of its innovations.

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