Business Opportunity Algorithm for ISO 9001: 2000 Customer Satisfaction Management Structure*

Tieh-Min Yen, Yi-Chan Chung and Chih-Hung Tsai

Department of Industrial Engineering and Management, Ta-Hwa Institute of Technology,
1 Ta-Hwa Road, Chung-Lin, Hsin-Chu, Taiwan, Republic of China

Abstract: Corporate sustained growth relies on the ability to continually generate profits, this in turn depends on their products meeting customers' needs and expectations. Generally, customer satisfaction is evidenced in the high rate of customer loyalty, good reputation, increase in market share, improvement of performance and reduction in complaints, etc. In contrast, the results of poor customer satisfaction include loss of customers, decrease in market share, deterioration of performance, poor reputation and increase in customer complaints, etc., which directly affects gross turnover and operating costs. Therefore, customer satisfaction has become an important operating goal to which enterprises have competed to make the commitment. Moreover, measuring and monitoring customer satisfaction has become an important research topic for enterprises. The operational concept based on customer satisfaction has been collected in 2000 edition of ISO 9001, where the operation of quality management system is customer-oriented and aims at improving customer satisfaction; customers' needs and expectations are satisfied through clear management responsibility, communication, resource management and product realization process; the structure of measuring and monitoring customer satisfaction is proposed on the basis of overall performance of the quality system and requires enterprises evaluate performance from the perspective of customers. This study attempts to explain how to set up a complete customer satisfaction and target management system based on the concepts of customer satisfaction and target management proposed in ISO 9001: 2000, conduct real-world case study, identify the critical items in customer recognition through market analysis, survey of satisfaction and business opportunity algorithm and eventually integrate corporate objectives to achieve sustained improvement.

Key words: Customer satisfaction, ISO 9001: 2000, business opportunity algorithm

INTRODUCTION

Corporate sustained growth relies on the ability to continually generate profits, this in turn depends on their products meeting customers' needs and expectations. Generally, customer satisfaction is evidenced in the high rate of customer loyalty, good reputation, increase in market share, improvement of performance and reduction in complaints, etc. In contrast, the results of poor customer satisfaction include loss of customers, decrease in market share, deterioration of performance, poor reputation and increase in customer complaints, etc., which directly affects gross turnover and operating costs. Therefore, customer satisfaction has become an important operating goal to which enterprises have competed to make the commitment. Moreover, measuring and monitoring customer satisfaction has become an important research topic for enterprises. The operational concept based on

Corresponding Author: Chih-Hung Tsai, Department of Industrial Engineering and Management,
Ta-Hwa Institute of Technology, 1 Ta-Hwa Road, Chung-Lin, Hsin Chu, Taiwan 30050,
Republic of China Tel: +886-3-5927700~ 2953 Fax: +886-3-5926848

customer satisfaction has been collected in 2000 edition of ISO 9001, where the operation of quality management system is customer-oriented and aims at improving customer satisfaction; customers' needs and expectations are satisfied through clear management responsibility, communication, resource management and product realization process; the structure of measuring and monitoring customer satisfaction is proposed on the basis of overall performance of the quality system and requires enterprises evaluate performance from the perspective of customers. Systematically monitoring customer satisfaction can provide managers with useful information for diagnosis, help an enterprise identify areas of improvement and thus increase profitability through continuous improvement in customer satisfaction. The methodology for measuring customer satisfaction often adopted by many enterprises is survey by questionnaire either at regular intervals or after products and services are delivered. Returned questionnaires are analysed and the results are provided to management and then documented. It seems that the concepts and standards of customer satisfaction and target management in ISO 9001 (2000) have not really been recognized in all organizations and hence produced no benefit to business operations yet. We do not consider customer satisfaction at the time of the survey, its purpose, chosen objectives, design of the questionnaire, the rate of response, selection of samples, customers' recognition and statistical analysis techniques, etc. We only focus on the basic structure of customer satisfaction and target management, which is not an integrated and correlative model. Thus it cannot benefit all enterprises. This study attempts to explain how to set up a complete customer satisfaction and target management system based on the concepts of customer satisfaction and target management proposed in ISO 9001 (2000), conduct real-world case study, identify the critical items in customer recognition through market analysis, survey of satisfaction and business opportunity algorithm and eventually integrate corporate objectives to achieve sustained improvement.

QUALITY COMPETITIVE ADVANTAGE

In recent years, the change in global market competition has heavily impacted on enterprises' operations. Customers are more and more attentive to the quality of products and services. The four key elements are product quality, time (speed), flexibility and costs (price) determines the enterprises competitive ability (Garvin, 1987; Stalk, 1988; Gerwin, 1993; Porter, 1985). Garvin stated in 1987 that quality competition has eight dimensions, which are performance, features, reliability, conformance, durability, Ser+viceability, Aesthetics and Perceived Quality. He indicated that traditional emphasized quality, Conformance and Reliability, is still important. However, enterprises should apply this structure to search market opportunities and develop products differences to beat competitions (Garvin, 1987). In ISO 8402, quality has been defined as the totality of characteristics of an entity that bear on its ability to satisfy stated and implied needs. Needs should be translated into specifications which have characteristics such as performance, usability, serviceability, reliability, maintainability, security, price and aesthetics, etc. (ISO 8402: 1994). In ISO 9000 (2000), the quality has been defined as a characteristic that a product or service must have, a quality product or service is one that meets the needs and expectations of customers (Leonard, 1997). The basis of achieving customer satisfaction is to satisfy customers' stated and implied needs and expectations, the definition of quality in ISO 9001 (2000) has implied competitive elements of time (speed), flexibility and costs (price). Because the market feature of demand is uncertain, product variation and short life cycles, means an enterprise must have flexibility in product quantity, product portfolio, ability to change lines, revision of manufacturing processes, materials and good response etc. (Gerwin, 1993); shortening the managing flow time of products design and development, manufacturing, sale, transport, delivery and rear support services (Stalk, 1988), in order to quickly reply customers and market demands, or control costs-drive factor and re-plan value chain to obtain costs advantages (Porter, 1985). However, if an enterprise can not grasp customers' exact needs and quickly reply to the trends and changes of market, it will swiftly lost market.

THE STRUCTURE OF CUSTOMER SATISFACTION AND
TARGET MANAGEMENT

Customer satisfaction and target management structure derive from ISO 9001: 2000 Quality Management System Requirements and compliance with process-oriented P-D-C-A Management Methodology. As in Fig. 1, firstly, enterprises should set up definite policy and target and also the degree of customer satisfaction should be clarified. Secondly, according to quality target, enterprises should plan total quality management system structure, authority and responsibility control, operation process and standards, in order to ensure comply with plan and achieve enterprise quality target. Thirdly, enterprises should carry out communicating harmonization, encourage staffs involvement and full commitment to customer satisfaction, also managers' decision-making should comply with the quality policy and target as the maximum guidance principle. Enterprises provide all required resources, according to the plan then produce and sell products to customers. Fourthly, enterprises aim at customers' after sales feedback, to verify the degree of customer satisfaction. If it does not achieve the expected degree of satisfaction, the manager should identify the cause and work out an improvement scheme to enhance customer satisfaction. Rectification and preventing methods can be used through adjusting original quality policy and target, quality rules, communication, training, resources and operation process, etc. After the adjustment and improvement, enterprises should re-measure customer satisfaction, to ensure the improvement scheme is proper and effective. Fifthly, enterprises should provide customers' feedback information to management for inspection and verify appropriateness and effectiveness of the definition of quality policy and target, quality scheme and operation methods.
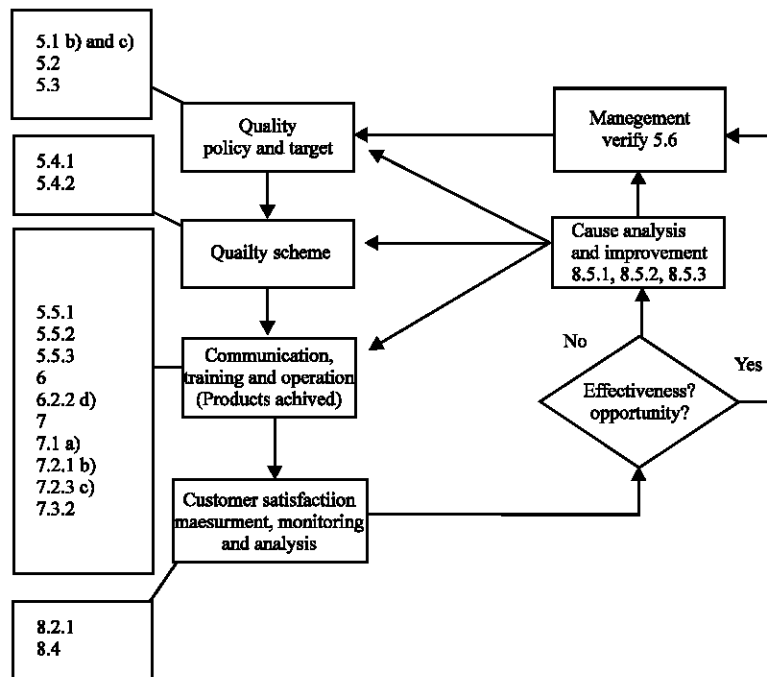

Fig. 1: The structure of customer satisfaction and target management

Quality Policy, Target and Scheme

A Quality Management System uses from top to bottom development model. According to the survey of market and customers, after understand customers' needs (7.2.1), enterprises then decide how the quality policy and target will develop, from there the quality management system can be developed. Enterprises should make quality policy and target to show the advancing of quality management system, implementation and continuously improve the process (5.1 b and c). A well drafted quality policy can provide the specific process required for setting up and monitoring the quality target (5.3). As it also is customer-oriented it aims to improve customer satisfaction (5.2). In addition, the quality target should be set up and implemented within every enterprise department and at each level, in accordance with quality policy (5.4.1). Furthermore, enterprises should develop the quality management system, in order to conform to (4.1) general requirements and quality target (5.4.2). Therefore, enterprises should firstly set up a definite quality policy and relevant quality target, at the same time, establish the degree of customer satisfaction they expect to achieve. Moreover, quality target should focus on satisfying customer concerns such as products quality, time, flexibility and costs, then through the scheme of quality management system guide the relevant operational process to achieve quality target.

Communication, Training and Implementing

If staffs are not clear about the enterprise's policy and target, then they cannot understand the authority and responsibility, methods and process, etc. in the scheme which in order to achieve the target. Therefore, staffs will not be able to improve and change their work methods in daily work and meet the enterprise's quality policy and target. As staffs are specific performers of the quality policy and target, enterprises should through communication and training ensure staffs understand the pertinence and importance of their activities and how to work to achieve the enterprise's quality target (6.2.2 d). Enterprises always ignore the external communication management issues. Enterprises should not only make sure that staffs understand the importance of customer needs, but also establish good relationships and proper communication with customers, which is one of the key factors effecting customer satisfaction. Because only through close co-operation and communication with customers will the enterprises discover customers' needs and satisfy their requirements (ISO, 9000, 2000), therefore, enterprises should agree and implement effective schemes to communicate with customers. (7.2.3). Communication and Training are also a key factor for enterprises' success. Therefore, after setting up quality policy and target, enterprises should aim at specifying relevant responsibility and authority and carry out internal communication (5.5.1), appoint a management representative responsible for quality management system's establishing, implementing and maintaining and ensure enterprises totally recognize customers' needs (5.5.2). In addition, enterprises should set up proper communication process and carry out effective performance compliance with the quality management system (5.5.3), ensure from management level to basic staffs all have the same unanimous sense of quality policy, target, authority and responsibility, quality management system and customers' needs, accordingly, within the enterprise, the decision making and performance will not deviate from quality policy, target and customers' needs. However, a unanimous sense does not mean the same thinking; instead, there is a common recognized target which can consolidate all staffs together, through all staffs participation and creation a sense of mission, which will promote the enterprises' continual improvement. When planning product realization, enterprises should examine products' quality target and requirements (7.1 a), analyze the whole value delivery process on the basis of the important factors of customer satisfaction defined early and implement the identified key operational processes (7) and resources (6) required in achieving goals.

Customer Satisfaction Measurement, Monitoring and Continual Improvement

Nowadays, many enterprises' operations centre on the customer. To provide customers maximum value is a typical public announcement. Accordingly, performance of announcement start from customers' views, which has become the highest management level's prior task (ISO 9000: 2000). Whether enterprises are conforming to customers' needs or not they should manage the information relevant to customer perception and use it as a measurement for assess quality management system performance (8.2.1). According to the customer assessment, enterprises can review their performance from the customers' angle. However, if enterprises want to explore new competitive targets, it is usually difficult to anticipate future products or service features and characteristics. If enterprises want to get the point, they should firstly learn to make proper assessment on customers' needs and products' necessary performance (Kaplan and David, 1992). Therefore, the method to obtain and use customers' feedback information and decision making (8.2.1) is an important topic. In the past, many studied methods to measure customer satisfaction have been adopted and documented. Firstly, we are not concern about which method can effectively collect customer perception information. After collecting relevant customer's information and analyze it (8.4), enterprises always neglect to link this information with enterprises competitive elements and assess it. Therefore, enterprises cannot discover the key point to explore new products (7.3.2), different competitive area and target market, draft new strategies and target, or improve existing quality management system. However, this information must go through a feedback system, imputing the valuable information into rectification, prevention (8.5.2; 8.5.3), management and monitoring schemes (5.6) and all activities to achieve the continual improvement goal (8.5.1). Customers' feedback (5.6.2 b), (7.2.3 c) and customer perception (8.2.1) are both based on recognizing and understanding the customer needs and expectations, it is not concerned with non-customers' stated requirements, however the important basic elements are identified (7.2.1 b) for specific or intent use. In 1997, Leonard brought the concept of observing conduct to find out customers' non-state needs, especially when they are not aware of their own action (Hamel and Prahalad, 1994). By observing customers' behaviors, the potential needs can be found, this helps enterprises to develop their products differently from others or enhance customer satisfaction in order to increase their market share, which is one customer satisfaction topic. Therefore, enterprises not only need to collect customers' basic recognition information, but also need use other methods to obtain customers' needs and expectation.

A CASE STUDY OF CUSTOMER SATISFACTION MANAGEMENT STRUCTURE

Investigation of the Degree and Importance of Customer Satisfaction

This study uses a real air conditioner and fire protection ventilating machine manufacturer as the object for survey and analysis. This manufacturer was certified by ISO 9001 in the end of 2000, after management set up 2001 quality target, operating until now. Firstly, we collected the manufacturer's relevant information of year target performance, for analyses and evaluation of its performance. The Table 1 shows that they have not achieved the target of effective maintenance; other targets have been achieved smoothly. However, achieving targets does not mean an increase in turnover, market proportion, or high degree of customer satisfaction. We need further studies on specific issues such as analyses of the market and customers' needs; monitor the degree of satisfaction, the degree of importance of customers' recognition on the manufacturer and products' characteristics and customer feedback, etc., we can then clearly understand the manufacturer's whole performance and the direction of continual improvement in the future. This investigation is aimed at 2006 all clients, through fax, telephone or visit to complete questionnaire. There are 76 questionnaires have been sent out in total, 58 valid reply, therefore, the valid return rate is 76.32%. Questionnaire is designed in 5 degrees, which are very satisfactory, satisfactory, general, unsatisfactory, very unsatisfactory and further

Table 1: Quality target, customer satisfaction and business opportunity algorithm and analysis

Items in survey	Quality target	Internal performance measure	Market and historical information analysis	Importance degree of customer recognition	Degree of customer satisfaction	Customers feedback (complaint, suggestion and perception)	Business opportunity	New quality target
Service Attitude				8.6	8.33	Couriers' attitude is not good when they unload goods (8.6)	17.47	When entrust delivery, contract should give clear indication of authority, obligations and work attitude
Degree of harmonization and Co-operation				8.24	7.93		8.55	
Price of Products			Competitor's market price is lower by circa 5% (5.8)	9.36	6.26	Should adjust selling price in business depression (5.6)	23.86	Decrease costs by 10% to be gradually reflected in pricing
Timeliness of delivery	Delivery late rate <5%	4.5%		8.79	7.43	Cannot deliver urgent and temporary orders and then lose order. Cannot deliver earlier when requirements change (8.5)	18.65	Late delivery rate <3.5%; Shorten average manufacturing time to 2 days; Set up storage control system
Quality of products	Product defective rate <0.5%	0.5%	Equipment noise should be lower than 60dBA; Products should pass FM verification (7.5)	9.62	7.07	The defective rate of products and accessories are higher than other brands in the same category (9.1)	28.77	Products did not pass the verification rate <0.5%; Research and develop products with low noise; Products pass the FM verification
Safety and hygiene	Installation of equipment, no injury	0		5.02	7.12		5.02	
Environmental protection			Competitors pass ISO 14001 qualification (3.6)	3.91	6.98		7.51	
Maintenance service	After receive the order, finish maintenance within 24 h	Average 50 h	Air conditioners and fire protection vents usually lack maintenance; should go into maintenance market (7.9)	8.38	8.11		16.55	After receive the order, finish maintenance within 24 h, sign maintenance contract
Logistic support			Competitors change to invest in	1.95	7.48		5.55	

Table 1: Continued

Items in survey	Quality target	Internal performance measure	Market and historical information analysis	Importance degree of customer recognition	Degree of customer satisfaction	Customers feedback (complaint, suggestion and perception)	Business opportunity	New quality target
Corporate image			important accessory suppliers (3.6) Customers consider this manufacturer the secondary brand (5)	2.29	7.68		7.29	
Degree of customer satisfaction	The number of customer complaints <5 / per year Average total score for the degree of satisfaction in survey reached 85, with a standard deviation less than 10	3	Market penetration rate: Manufacturer A: 50% This manufacturer: 30% Manufacturer C: 10% Others: 10%		75.02 $\delta = 8.94$			Number customer complaints <3 / per year; Average total score for the degree of satisfaction in survey reached 85, with a standard deviation less than 10

divided in 10 dimensions. The content focused on 10 topics which the manufacturer concerned. In the questionnaire, it is also designed that customers tick the degree of 10 topics' importance, in order to obtain the important items and value where customers concern. In addition, there is a column for customers write down other comments. After using SPSS analysis software analyzes the data, the main results are shown in Table 1.

Business Opportunity Algorithm

Ulwick (2002) mentioned in Turn Customer Input into Innovation how enterprises find out the business opportunities in most new products and services and how to rank these opportunities in a prior sequence? However, the outcome-oriented customers study provides a simply and definite answer, which is that the best business opportunity is in the customer recognised important items, where existing products can not meet their needs. The writer also provided a simple algorithm:

Importance + (Importance - Satisfaction Degree) = Business Opportunity;
When (Importance-Satisfaction Degree) <0, then (Importance-Satisfaction Degree) = 0

This calculation provides the business opportunity; therefore we are able to identify the best business opportunity with the most potential (Ulwick, 2002). Although this paper provides an advanced positive view point-outcome-oriented customers study, in practice, it will be difficult to examine because of products receivers, users' difference, even some products are only provided for urgent use and the after-use result and performance can not be obtained. The manufacturer, this research study object, just has this feature. Furthermore, the case study in this paper focuses on product itself and product's research and development, does not mention other quality competition dimensions issues. Therefore, this study adjusted Ulwick's Business Opportunity Algorithm and use it as the best strategy method on customer satisfaction and quality target management performance assessment and link.

Market Study + Importance + (Importance-Satisfaction Degree) + Customers Feedback (Complaint and Comment) = Business Opportunity;
When (Importance-Satisfaction Degree) <0, then (Importance-Satisfaction Degree) = 0

Both market study and customer feedback come from direct or indirect correlation of customer information such as industry analysis and study, competition analysis, research or media report, customers' behaviors observing and study, customers' requirements and contracts information, products delivery and services, customers' complaint and direct communication, etc. Through these activities, we aim to identify the products and services which customers need but may not be aware, or a new customer group which shown in Fig. 2. Because the degree of customer satisfaction survey only focus on a particular class of customers' already known demands, it is useful to improve existing products, but it can not stimulate the innovation of new products and services (Kaplan and David, 1992). Moreover, importance degree factors only help enterprises understand different customers' view on products, it is difficult to identify a new customer group distinct from market, therefore, there are another two reference factors are required in the Business Opportunity Algorithm.

The market study and customer feedback are quantified and assessed in 10 ranks depending on their importance to the enterprise. The rank and the approach of questionnaire are scored based on the subjective recognition by top management and the average is derived (Table 1).

Performance Assessment Methods

Usually, enterprises assess their performance from their internal views, based on the efficiency or effectiveness index to examine the performance and ignore external views. Enterprises' internal
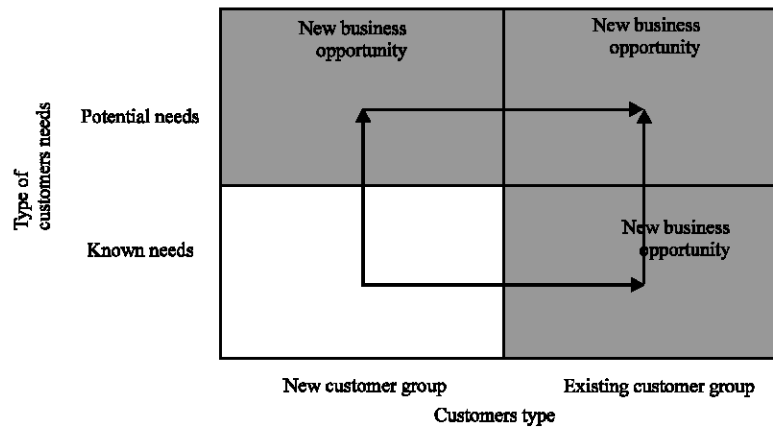
Fig. 2: Product/service or new customer group

management and work only has a simple purpose, satisfying customers' needs and obtaining profits. If all efforts do not enhance any customers' value, its effectiveness is equal to zero. Therefore, monitoring effectiveness should consider about external views. When the value of (Degree of customer satisfaction - Importance degree of customer recognition) is negative, that means customer needs have not been satisfied. Therefore, performance assessment algorithm should consider both internal views and external views:

Efficiency or Effectiveness Index conforms to Requirements Λ (Customers' Satisfaction Degree - Importance Degree of Customer Recognition) <0

or

Efficiency or Effectiveness Index conforms to Requirements Λ (Customers' Satisfaction Degree - Importance Degree of Customer Recognition) has significant improvement compared with last year.

Note: When the importance degree of customer recognition has no significant changes.

Target Setup Methods

In quality target, customer satisfaction and business opportunity algorithm analysis table, if business opportunity <10, the relevant target should be setup and achieved. When customers concerned items' value is high and bigger than existing satisfaction degree, which means customer needs have not been satisfied. Therefore, whatever the previous targets' value has been achieved, enterprises still need to set up new target regard to customers' concerned topics for continual improvement.

Though importance degree of customer recognition + (degree of customer satisfaction - importance degree of customer recognition) <10, add with market study or customers' feedback internal importance degree, the value possibly can <10, it is not relevant if the value of external importance degree high but internal importance degree low; or internal importance degree is high but external importance degree is low. It is generally thought that market research or customer feedback on relevant topics may conceal many business opportunities, which enterprises may be able to exploit, help enterprises enter into new business opportunities area as shown in Fig. 2, enable enterprises to beat competitors, open new business field.

CONCLUSIONS

The ISO 9001: 2000 quality management system requires clear explanation in its statement (0.1) that the design and implementation of enterprise quality management system are affected by specific

enterprise objectives. In addition, in process orientation (0.2), it is emphasized that enterprises need to understand and conform to requirements, additional value requirements of the process, process performance and effective results and continual improvement of target measurement basis. Therefore, according to customer satisfaction management, firstly, enterprises should set up the target in terms of degree of customer satisfaction and other quality-related sub-targets to help achieving the primary target. Through monitoring and measuring satisfaction degree, enterprises will be able to determine target achievement, process performance and effectiveness and conformability and importance of customer needs and then feed this information into quality policy, quality target and quality management system for planning and implementation. Accordingly enterprises can turn customer feedback into innovation, enhance competitiveness and create new business opportunities.

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