
Did your efforts really win customers' satisfaction?

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Abstract

The national customer satisfaction index (NCSI) shows that these indices compare and estimate the competitiveness and financial benefits for countries and industries. However, general enterprise uses the concepts of NCSI deficiently in the practice of CS activities. This paper will express the latent variables in the NCSI models of different countries in order to highlight all the efforts companies have made in promoting CS activities to win customers' satisfaction and loyalty. Through the successful experience of a Taiwanese company, the relationship between the NCSI and the various concrete issues within the CS program is compared. Also, this article proposes the concept of a "matching rate" to show how the necessary concrete issues of all CS activities must link with the latent variables of NCSI. Finally, the managerial implications of the matching rate are explained, and it is suggested how an enterprise can use the rate to draw up the strategy of the CS program.

1. Introduction

In this age, customer satisfaction (CS) clearly defines the true meaning of present economic activity because the amount of production or consumption is no longer the essential item for final analysis. Its importance lies in recognizing how to please the customers economically and effectively. Therefore, many scholars have discovered after much research that there is a positive and significant relationship between CS and the long-term financial performance of companies (Fornell *et al.*, 1996; Anderson and Fornell, 2000; Su *et al.*, 2001). Every country cognizant of this trend is gradually including CS as an important judgment criterion for the National Quality Award to be one of the major orientations in a quality promotion policy. Thus, we can see the importance that CS has on the future development of the corporation. Therefore, CS should play a central role in the company's TQM, and it will also be one of the most important strategies and issues for the corporation in the future (Chan, 1993; Eklöf and Westlund, 1998; Naumann *et al.*, 2001).

The importance of CS is widely recognized. As a result, each country has provided its own national customer satisfaction index (NCSI) to analyze the level of satisfaction brought to the consumers through the companies' efforts. The results could be used in performing a competitive advantage comparison between industries and companies, as well as important referential indices when developing company strategy (Fornell *et al.*, 1996; Eklöf and Westlund, 1998; Anderson and Fornell, 2000). Therefore, NCSI is regarded by enterprises as a crucial ingredient in a quality competitive strategy.

After the literature has been reviewed and compared, the NCSI models of Sweden, Germany, USA, Europe, Norway, and Switzerland, have a firm grasp on the important latent variables, indicators, and satisfaction drivers, which are components of measure elements. However, in actual practice, just as Anderson and Fornell (2000) said, the diagnosis performed through each country's NCSI model and the result obtained are not totally realistic. Especially when the products and services provided by the enterprises are scattered in different markets, the referential value of the diagnosed result is very limited. Therefore, to enterprises that still have not employed CS, it is very difficult to employ these indices and determinants physically in order to promote relative matters of a CS program. Also, to companies that have already employed CS, even though various improvement issues and operations have been performed internally, the obscurity between the rolled out CS issues and the CS factors will fail to gain approval from the clients, and result in a less than satisfactory degree of customer satisfaction.

In order to highlight all the efforts companies have made in promoting CS to win customers' satisfaction effectively and to raise the possibility of a company's success in employing a CS program, this paper will analyze the NCSI models and latent factors of each country. Its purpose is to be the guideline for companies when determining CS event strategies and issues. Through the experience of a Taiwanese manufacturing company, we shall analyze the concrete issues of its CS performance, and its relationship with the NCSI to explain how business operations that are more relevant to the measuring factors of NCSI are more effective in raising the company's CS.



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2. NCSI

The purpose of NCSI is to gain a deeper insight into the interaction between the customer and the supplier, in order to provide enough customer satisfaction information as referential data in planning better policy and decision making. The operational result of NCSI indicates that elevating customer satisfaction can secure revenue, reduce the cost of future transactions, decrease price elasticity, and minimize the likelihood that the customer will defect if quality falters (Anderson, 1996; Bolton, 1998; Anderson and Fornell, 2000). Therefore, whether on a regional level, national level, industry and individual company levels, or customer level, the periodically updated NCSI is seen as an important referential index. Especially on the individual company levels, NCSI is used for studying various driving tacks and early warning indicators in areas such as company profitability, creation and sustainability of real job opportunities, benchmarking, etc.

2.1 The characteristics of NCSI

Currently, while the measuring factors employed by each country are slightly different, the questionnaire design, research method, constitutive characteristics and certain properties that must be satisfied in measurement are more or less similar. Therefore, while we cannot judge the best or worst of each country in achieving customer satisfaction through the data, the report indicates that the consumers have preferences regarding the product or service quality provided by the companies of that country.

Generally speaking, the design of the questionnaire, the specification and the wording of questions have been chosen in order to obtain observable measures allowing for the estimation of each of the latent variables defined in the NCSI model (Eklöf and Westlund, 1998). Also, the content of the questionnaire is mostly based on the theoretical model of quality, satisfaction, and performance set by the Swedish index (SCSI).

As for data collection methods, they are mostly based on: a direct postal survey; a postal survey with pre-notification; and a telephone survey. The difference between the first two was non-existent. However, there was a small bias from the telephone survey. Basically, the differences were small, and hence the choice of method could be based solely on economic considerations (Kristensen *et al.*, 2000). As for the estimate of each latent variable, a partial least squares method is employed, mainly because many advantages come from this method in the

relative surveys on customer satisfaction (Cassel *et al.*, 2000).

Also, in the constitutive characteristics, each NCSI usually has the following six characteristics (Bruhn and Murmann, 1998):

- 1 A boundary based on the country or the economical region.
- 2 Comprising several industries/sectors.
- 3 Through a neutral institution.
- 4 Focused on enterprises and public institutions.
- 5 Conduct periodical analyses.
- 6 A measurement of satisfaction as well as the key success factors.

In addition, as to properties that an NCSI system has to fulfill in quality measuring, seven dimensional abilities must be included:

- 1 validity (relevance aspects);
- 2 reliability (precision, coverage and other accuracy components);
- 3 predictive power;
- 4 simplicity;
- 5 comparability;
- 6 robustness; and
- 7 availability (Eklöf and Westlund, 1998).

Also eight properties raised by Anderson and Fornell (2000):

- 1 validity;
- 2 precision;
- 3 reliability;
- 4 predictive power;
- 5 simplicity;
- 6 comparability;
- 7 coverage; and
- 8 diagnostics.

In other words, a high-quality NCSI system should include the above characteristics to be able to compare satisfaction with main competitors and, over time, be able to indicate the relationship and gap between efforts made within the company and their effects on customer satisfaction.

Also, since the NCSI of each country has the above common properties, and while each indicator and the measurement factors differ somewhat, they could all reflect the customer's satisfaction with the products or services provided by the company. Furthermore, the measuring factors of the NCSI models proposed by each country definitely have the ability to indicate the various demands customers have on products or services.

2.2 The latent variables of the NCSI models

Currently, at least the following six NCSI models have been developed (Kristensen *et al.*, 2000; Bruhn and Grund, 2000; Johnson *et al.*, 2001):

- 1 The Swedish Customer Satisfaction Barometer (SCSB, since 1989).
- 2 The Deutsche Kundenbarometer (DK, since 1992).
- 3 The American Customer Satisfaction Index (ACSI, since 1994).
- 4 The European Customer Satisfaction Index (ECSI, since 1998).
- 5 The Norwegian Customer Satisfaction Barometer (NCSB, since 1998).
- 6 The Swiss Index of Customer Satisfaction (SWICS, since 1999).

NCSI models of each country are mainly structural equation models with unobservable latent variables. Even the recently developed SWICS also tries to combine the advantages of the US and the German indices (Bruhn and Grund, 2000). Therefore, most scholars have approved the method of learning customer satisfaction through different latent variables, indicator, and satisfaction drivers.

Although the latent variables defined by various countries are somewhat different, the objective of wanting to realize customer satisfaction is the same. From the perspective of companies rolling out a CS program, rather than comparing to see which measuring factor is more appropriate, perhaps the better approach is to regard them as goals towards which the company has to work in performing customer service. Therefore, if the company can regard all the latent variables as guidelines for promoting concrete issues of a CS program, the possibility of a successful realization of CS should be elevated.

Consistent with this intention, Table I focuses on the measuring factors of the already developed six NCSI models and proceeds with comparisons. From Table I we can see, in the 13 measuring factors that have been organized, except that "NCSI" and "loyalty" appear in each country, "expectation", "quality", and "value" have been approved by more than three countries. The constructs of "complaint" and "image" have also been adopted by two countries. However, it is worth noticing that, while the usage of words of each country in measuring factors is the same, the scope and the target are slightly different. This paper will not compare nor analyze this aspect, but only integrate all the related points of view for the determination in section 4.

3. Empirical investigation

This section is to introduce the experience of promoting a CS program of a major multiple manufacturing company in Taiwan. We shall

attempt to grasp a practical method in successfully employing a CS program in this case-in-study.

3.1 The case-in-study

The company was founded in 1962 as an early professional manufacturer of home electronics. It has developed into a multiple manufacturer of products in living, system, and industry equipments. Six production subsidiaries are under its control. Each is responsible for manufacturing family, industry, and system equipment products. Also, three selling subsidiaries have been established, each responsible for domestic and foreign vending business and technical service.

Since the product development technology of the case-company is closely related with the parent company in Japan, an Ability Development Center, Manufacturing Technology Training Institute, and Marketing Research Center have been established to import Japanese skills and rear company élites. The goal has always been "Customer Satisfaction No. 1: CS No. 1," while pursuing the quality on product and service relentlessly. The company was awarded with the National Quality Award in 1996.

3.2 Customer satisfaction implementation

In a high-level executive meeting in 1993, the case-company passed the proposal of elevating the company's CS image. In the subsequent 15 months, the company went into pilot phase and promotion phase. In these two phases, aside from diagnosing the company's constitution, establishing the vision, and building up the organizational system, the company also finished the setting-up of knowledge, leaflets, periodicals, measuring criteria and methods. Currently, due to the changes and requirements of the external requirement, the promotional organization of the CS program has progressed from the above two phases to the mature phase, and the current stable phase. The change of each phase signifies the company's success in changing and developing the CS program, as well as indicating that the improvement concept of customer service is deeply ingrained in all the employees.

In the current stable phase of the case-company, the total organization has five major groups, including production, business operation, management, service, and transportation, with 36 divisions subdivided into 16, nine, seven, two, and two units respectively. Within these 36 divisions, there are 24 CS promoting bureaux. Under these

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Table I
NCSIs comparison and definition

No.	Latent variables Elements	Countries						Explanation/indicators/satisfaction drivers
		SCSB	DK	ACSI	ECSI	NCSB	SWICS	
1	Customer expectations	<input type="checkbox"/>		●	<input type="checkbox"/>			* Including 1. Overall expectation of quality (pre-purchase) 2. Expectation regarding customization (pre-purchase) 3. Expectation regarding reliability, or how often things would go wrong (pre-purchase)
2	Perceived quality			●	<input type="checkbox"/>	<input type="checkbox"/>		* Including 1. Overall evaluation of quality experience (post-purchase) 2. Evaluation of customization experience (post-purchase) 3. Evaluation of reliability experience, or how often things have gone wrong (post-purchase) * In the ECSI model, perceived quality is divided into "Hard ware" and "Human ware." The former represents the quality attributes of the products or the services, while the latter expresses the interactive factors between service and customers (for example, service attitudes and atmosphere) * In the NCSB model the quality is divided into many different quality dimensions; therefore it is permitted to set many quality drivers to be the lens of customer satisfaction
3	Perceived value (performance)	<input type="checkbox"/>		●	<input type="checkbox"/>			* Including 1. Rating of quality, given price 2. Rating of price, given quality 3. Value for money 4. Comparison with competitors
4	Customer satisfaction	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	* Including 1. Overall satisfaction 2. Expectancy disconfirmation (performance that falls short of or exceeds expectations) 3. Performance versus the customer's ideal product or service in the category 4. Distance from ideal 5. Fulfillment of expectations 6. Comparison with ideal * In the SWICS model use three indicators (overall satisfaction/satisfaction compared with expectation/satisfaction compared with ideal product) to further explain customer satisfaction
5	Customer complaints	<input type="checkbox"/>		<input type="checkbox"/>				* Including 1. The customer complained either formally or informally about the product or service 2. Complaints to management 3. Complaints to personnel
6	Customer loyalty	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	* Including 1. Repurchase likelihood rating 2. Price tolerance (increase), given repurchase 3. Price tolerance (decrease) to induce repurchases 4. Intention to buy again (remain as a customer) 5. Intention to buy additional services * In the SWICS model use three indicators/satisfaction drivers (intention to recommend/repurchase intention/intention to switch product/provider) to explain further customer loyalty
7	Customer dialogue						<input type="checkbox"/>	* In the SWICS model use three indicators/satisfaction drivers (willingness to contact the provider/easiness of dialogue/satisfaction with dialogue) to further explain customer dialogue
8	Customer image				<input type="checkbox"/>	<input type="checkbox"/>		* Including 1. Replaces customer expectations 2. Overall image 3. Business practice 4. Ethics 5. Social responsibility

(continued)

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Table I

No.	Latent variables Elements	Countries						Explanation/indicators/satisfaction drivers
		SCSB	DK	ACSI	ECSI	NCSB	SWICS	
9	Complaint handling					<input type="checkbox"/>		* Replace complaint behavior
10	Price index					<input type="checkbox"/>		* Replacing the perceived value construct with a perceived price construct
11	Affective commitment							* In order to explain loyalty in more detail, it is essential to consider the psychological barrier and emotional recognition endured by the customers when faced with switching
12	Calculative commitment					<input type="checkbox"/>		* In order to explain loyalty in further detail, it is essential to consider that, when customers are faced with changes, they will be more careful in considering switching costs and other factors
13	Industry-specific satisfaction drivers		<input type="checkbox"/>					* Including 1. Staff friendliness 2. Reliability 3. Competence 4. Availability of personnel etc.

Notes: ● represents the three antecedents in ACSI model; represents the latent variables for each NCSI model

bureaux, there are 73 affiliates responsible for the promotion of CS-related activities in the workplace and for achieving the goal of employee participation.

The push is for total participation by every group in the company to be involved in the CS program. All the CS-promoting bureaux are responsible for monitoring the CS annual goal and for enforcing the employees' CS improvement consciousness of the divisions. The Customer Service Promotional Center works together with all the promoting bureaux from the standpoint of educating and integrating assistance, helping to push for the CS goal and business of the company.

That the case-company can successfully promote the CS program in four development stages, aside from the promotional phase and organizational activities, is very consistent with the following five main steps that are offered by William (1990). Also, the two basic principles of employee participation and continuous improvement are the main encouraging factors:

- 1 Defining the scope that the CSI wishes to achieve.
- 2 Defining the basic criteria for satisfying the customer.
- 3 Developing standard measures of performance.
- 4 Designing a monitoring program.
- 5 Linking the CSI to performance management.

3.3 Customer satisfaction survey

Although CSI is a customer evaluation that cannot be measured directly, it is a forward-looking function that can be compared at a

later date. Therefore, uniformity and comparability are two fundamental properties in the methodology of ACSI (Anderson and Fornell, 2000).

The case-company has also realized the importance of these two criteria; therefore in the past nine years, the process and methodology of monitoring customer satisfaction by conducting a survey, performing CSI calculations, and the result analysis are basically the same. Also, it is very close to the six steps in the framework for monitoring satisfaction proposed by Sharma *et al.* (1999):

- 1 Establishing clear objectives and target satisfaction level.
- 2 Develop strategy.
- 3 Execute.
- 4 Measure satisfaction.
- 5 Compare observed satisfaction with target satisfaction level.
- 6 Identify for not meeting target satisfaction level.

This also indicates that a reasonable and effective monitoring process of the case-company enables the CSI presented in the nine years to have a very high degree of reliability.

The case-company also conducted a results survey of the CS program and adopted four methods in order to proceed with the investigation and data analysis of the CS program. The methods adopted are:

- 1 *Estimation scales.* The measuring scales of each country are different; for example, ACSI adopts ten-point scale, while the German customer barometer adopts a fully verbalized five-point scale ("completely

satisfied", "very satisfied", "satisfied", "less satisfied", "dissatisfied") to measure the satisfaction degree of clients (Bruhn and Grund, 2000). However, in order to avoid skewness obtained in the measuring process, using a five-point scale should be the minimum requirement (Churchill and Peter, 1984; Drew and Bolton, 1991; Bruhn and Grund, 2000). The estimation scales employed by the case-company are the same as the German method.

- 2 *Investigation target.* The case-company uses the customers and retailers as the two main bodies to proceed with the investigation. It expects to obtain each retailer's satisfaction degree and opinion as important referential data when planning the next annual enterprise strategy and guideline. As for consumers, the focus is placed on the perception and expectation about product and service. However, the differentiation rate between the two questionnaires' content (= different item total ÷ total item numbers) is not to exceed 10 percent.
- 3 *Data collecting.* In January and February of each year, the CS Promotional Center entrusts professional survey companies to conduct a mail questionnaire to the two major groups periodically. For retailers, the annual sample size is 852 cases. For customers, there are 1,200 cases. Although the retrieval rate of both can be maintained above 30 percent and 35 percent respectively, to understand further the minds of these two client groups, 250 cases of face-to-face interviews and 300 telephone inquiries would be conducted. As for the design of the questionnaire content, besides the differences in the professional parts, the wording used for customers is also comparatively quantitative.
- 4 *Analysis method.* Even though adopting an appropriate statistical method to analyze the data, this can enable the result to be more accurate and accepted by most people. However, in order to facilitate an explanation to all employees, the CS Promotional Center and every CS promotional bureau will only use the following simple calculation methods to obtain CSI value. The histogram is used to analyze the same division, and the differences they present in each year. The pie chart is used to indicate the ratio of satisfaction and dissatisfaction of retailers and customers on some of the particular important items. Also, a folding line chart is used to indicate data from different divisions, and the changes in different periods for warning.

3.4 The result of a customer satisfaction program

The case-company divides the promotional organizations of the CS program into the above-mentioned five groups. The purpose is to handle the result of each group for further analysis and tracking. Also, in order to further reflect the various factors that would influence the result of the activity, the influencing factors of the activity result are divided into six functions: product, quality, vending, advertising, service, and transportation. These six functions are used as the basis for CSI. At the annual CS operation meeting, the strengths and weaknesses of the following eight main indicators are reviewed regarding retailers and general customers respectively:

- 1 The annual comparison and analysis of customers' satisfaction and dissatisfaction indicator based on customer types.
- 2 The annual comparison and analysis of customers' satisfaction and dissatisfaction indicator based on group types.
- 3 The annual comparison and analysis of customers' satisfaction and dissatisfaction indicator based on different main products of the divisions.
- 4 The annual comparison and analysis of industries' satisfaction and dissatisfaction indicator based on function types between the same trades.
- 5 Analysis and corrective measures taken toward the dissatisfied items by the division.
- 6 Analysis and corrective measures taken toward the dissatisfied items appearing for two consecutive years.
- 7 The annual comparison and analysis of satisfaction and dissatisfaction indicators based on products.
- 8 Next year's practical issues and operations aimed at elevating satisfaction and eliminating dissatisfaction.

As the support of the CS program is expressed by the highest level of executives, each division is particularly mindful about the eight main indicator results. In this respect, the elimination of dissatisfaction to reduce customers' complaints has always been the basic improvement issue of each group. Since the decision of (8) above affects the effectiveness of the promotion, it is the most consuming and most difficult item to reconcile.

Table II shows the value of each function's satisfaction index and total index since the case-company began to promote CS in 2000. In this respect the total index value is the

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Table II
Annual customer satisfaction indices (CSI)

Annual	1993	1994	1995	1996	1997	1998	1999	2000	Average
Functions									
Product	77	85	86	86	87	87	85	82	84
Quality	80	83	86	84	82	85	84	86	84
Vending	80	82	87	80	84	86	93	89	85
Advertising	78	83	84	83	80	86	80	84	82
Service	70	76	88	84	81	85	80	90	82
Transportation				85	84	81	82	79	82
Total index value	77	82	86	84	83	85	84	85	83

Note: CSI = number of very satisfied and satisfied ÷ total valid survey responses

average of six function indices. Since the index of transportation was not valued in the first three years, and was scattered within the other five functions, it was not independently calculated until 1996.

From Table II we can see that the index value of 1995 is the highest of the eight years, which enabled the case-company to obtain the National Quality Award of Taiwan in 1996. After 1998, the total index value presents a stable tendency. This result indicates that establishing a challenging goal, such as the National Quality Award, significantly brings the company to another peak within the CS program.

Also, from the average of each function index, the average CSI of "vending, quality, and product" is slightly higher than the other three. This indicates that the efforts spent by the company on these three functions obtained better approval from customers. The reason why the average satisfaction index of quality and product was higher than the other three should be related to the company's industry basis of manufacturing. For example, before implementing the CS program, the company already had a Quality Control Circle, 5S, a suggestion system, and total productive maintenance (TPM) activities that enforced production ability. These improving activities have obtained the trust and learning from the same trade and cooperative companies over the years. Also, the reason why the vending function obtained the highest average satisfaction index value was the combination of vending and production. This strategy can facilitate consistency between production and marketing action, and obtains the approval of the retailers. The unification of production and vending can elevate the company's ability in developing new products, and obtain approval from retailers and consumers.

As for advertising, service, and transportation, although the average values are very close, some functions' annual CSI

fluctuates more dramatically (for example: service), and some less (for example: transportation). This indicates that the case-company has not yet grasped the main point about the three CS programs. Only further adjustment can win the customer's highest approval. Moreover, we can see that the trend of CSI values of "quality, advertising, and service" is very close to that of the total index value. This indicates that these three have an apparent positive relationship with the total index. Meaning that, if we increase or decrease the percentage of these three, it should effectively elevate or debase the company's CSI value.

4. Discussion

In fact, in the first year and a half, the CS program was not really plain sailing in the case-company. Most employees expressed deep dissatisfaction and disappointment with the efforts made internally that they did not demonstrate better results in the survey of the following year. Many low level managers even started to criticize the necessity for this program, and doubted the effect that a CS program has on elevating the company image. Therefore, the internal dissension began to spread. Faced with this problem, the enterprise executives and the hired consultant group decided that customer satisfaction should be raised by eliminating the major dissatisfaction of the customers. With the assistance of the consultants, the company readjusted the issues and operations, as well as goals and purposes of the CS program. Indeed, the total index value of the next period produced an obvious upward trend. This indicates that a correct CS program and concrete issues do have a positive influence on the successful promotion of a CS program.

If we further observe the concrete issues of the company from 1993 to 2000, we can see that the contents in their meanings and characteristics have a very high similarity to

the measuring factors of each country's NCSI. Therefore, this section will further discuss the meaning of the concrete issues to understand the degree of similarity between the two.

4.1 The total case numbers of concrete issues of each function

In order to smoothly complete the annual target of the CS program, the concrete issues proposed by the five groups are often characteristic of cross-departments. For instance, the production group does not propose issues that are related to product and quality only, and the business operation group does not only raise issues that are relative to vending. Therefore, if we further divide the issues proposed by the five groups during the eight years into six main functions as shown in Table III, we can see their total case numbers of the annual issues and the characteristics of each of the functions. For example, in 2000, the total case number is 191, out of which the product function-related cases are 34, and the quality-related cases are 35. From the subtotal column we can see that, among the total cases for eight years, the service function is the highest with 332 cases, while transportation is the lowest. The reason for this is in the service function, for it includes internal and external services, while the business characteristics of transportation are usually duller.

4.2 The matching rate between the concrete issues compared with the NCSI

If we compare the total index value of Table II with the total case numbers of Table III, we shall find that, although the 196 cases in 1999 are higher than the 175 cases in 1996, the CSI is the same. Furthermore, although 1999 is higher than the 164 cases in 1995, the SCI value was lower than 1995, indicating that, although the company spent more effort in promoting a CS program in 1999, the overall effect was no better than the years 1995 and 1996.

Faced with this phenomenon, a simple calculation is made. We first divide the cases in each function that are similar to the meanings and characteristics of the measuring factors in the NCSI model by the total case numbers, to obtain the "matching rate" of the concrete issues. The result will be listed in the percent column of Table III. If we compare the annual total index value of Table II with the annual matching rate of the total case numbers in Table III, we will find that during the first three years the annual index value and the annual matching rate both displayed positive growth. From 1996, the matching rate presents growth to a smaller degree, and the total index value rises and falls. However, from Figure 1 we have since discovered that the difference between the two is not great; therefore, the developmental trend of the two curves is very similar. This indicates that an obvious relativism exists between the case-company's matching rate and the CSI value. In other words, to the case-company, the height of the matching rate can be used to explain the effort result (CSI) of the CS program.

4.3 The relationship between matching rate and CSI

In order to further understand the relative strength between the CSI of each function and total CSI, the matching rate of each function and total CSI, and the total matching rate and the total CSI, we use the CSI value of each function and the total CSI value in Table II, as well as the function matching rate and total matching rate of Table III as basic data. We shall calculate the sample correlation coefficient (r), coefficient of determination (r^2), and the test statistic (t) value to conduct hypothesis testing to ascertain the related degree of each under the above three conditions.

From Table IV we can see that a high positive relationship exists between the total matching rate and the total CSI value. This result corresponds entirely with the

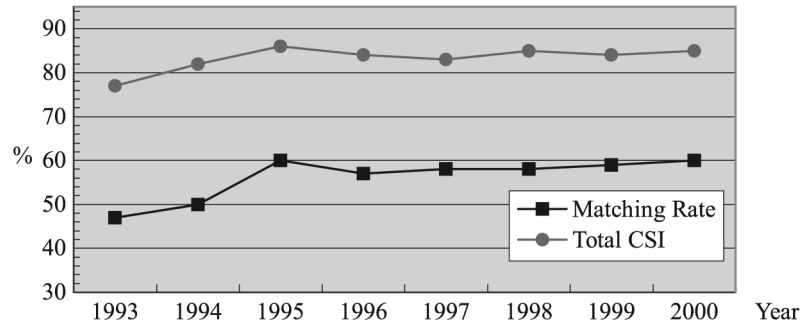
Table III

The total cases number of concrete issues of each function

Function attributes	1993		1994		1995		1996		1997		1998		1999		2000		Total	
	CN	%	CN	%	CN	%	CN	%	CN	%	CN	%	CN	%	CN	%	CN	%
Product	14	0.50	24	0.46	24	0.50	25	0.70	26	0.77	31	0.74	40	0.68	34	0.59	218	0.63
Quality	24	0.33	26	0.50	28	0.68	22	0.55	32	0.56	28	0.68	34	0.68	35	0.69	229	0.59
Vending	27	0.48	27	0.52	37	0.49	42	0.52	28	0.64	33	0.45	34	0.53	32	0.56	260	0.52
Advertising	20	0.65	20	0.60	24	0.88	25	0.72	21	0.76	32	0.78	32	0.72	39	0.69	213	0.73
Service	16	0.44	29	0.45	44	0.55	51	0.49	54	0.44	56	0.48	42	0.48	40	0.53	332	0.48
Transportation	5	0.40	2	0.50	7	0.57	10	0.50	10	0.30	16	0.31	14	0.36	11	0.45	75	0.40
Total	106	0.47	128	0.50	164	0.60	175	0.57	171	0.58	196	0.58	196	0.59	191	0.60	1,327	0.57

Notes: CN: case number; the value in the % column = case number related to the NCSI factors ÷ cases number

Figure 1
Comparison of matching rate and total CSI



conclusion of the previous section. We can also tell from the r^2 value that the total matching rate has a probability of 88.70 percent, which explains the positive relationship between it and the total CSI value. Apparently, the concept of a matching rate can be used as the forward-looking indicator of the total CSI value.

Also, between the CSI value of each function and the total CSI value, which are in sequence: service, quality, product and advertising, the four functional t -values are positively related to the total CSI value. Similarly, from the t -value of each matching rate and the total CSI value, we can see that the quality and service functions are also positively related to the total CSI value. In addition, only from the quality and service functions can we discover that each matching rate has a positive relationship with each CSI value. From the above three conditions, we ascertain that the quality and service functions are positively and highly related to the total CSI value of the company. This means that enforcing these two functions can clearly elevate the total CSI value. This conclusion corresponds with Fornell *et al.*'s (1996) research result obtained from an investigation of NCSI.

5. Managerial implications

In essence, CSI is not a goal, but a progressive and effective analysis tool within quality management. It can be used as a measurement of customer satisfaction, customer loyalty, and customer retention, as well as a tool for strategy development for companies (Eklöf and Westlund, 1998). NCSI can be used not only as a basic guideline in a company's competition strategy, but also as a strong indicator with directions for an individual company's improvement in enterprise operation strategy and constitution.

From the case-company we can see that the concept of the matching rate has a strong and apparent positive relationship with the CSI. Therefore, linking the concrete issues and operations contents of a company's CS program with the measuring factors of NCSI can definitively and effectively increase the matching rate of the CSI. This will enable companies to obtain higher commendations from clients when actualizing the CS program based on the concrete issues and operations organized internally. If the employees' rewards system and the customer satisfaction index can be linked, then the

Table IV
Related value between matching rate and total CSI

Functions	Each function CSI and total CSI			Each matching rate and total CSI			Each matching rate and each CSI		
	r	r^2	t^b	r	r^2	t^b	r	r^2	t^b
Product	0.7382	0.5450	2.6808	0.4076	0.1661	1.0933	0.5347	0.2859	1.5498
Quality	0.9178	0.8424	5.6628	0.9519	0.9060	7.6044	0.9056	0.8201	5.2305
Vending	0.5942	0.3531	1.8095	0.0820	0.0067	0.2016	0.1012	0.0102	0.2491
Advertising	0.7178	0.5152	2.5253	0.6910	0.4775	2.3415	0.3595	0.1292	0.9435
Service	0.9388	0.8814	6.6777	0.7489	0.5607	2.7675	0.8316	0.6915	3.6672
Transportation ^a				0.1345	0.0181	0.3324			
Total matching rate and total CSI				0.9471	0.8870	7.2274			

Notes: ^aSince the CSI value of the transportation function was not separately calculated for the preceding three years, which resulted in too few data, no comparison will be made here; ^b $t(0.025, 8-2) = 2.4469$

overall benefit for the company will be increased (William, 1990).

Also, through the concept of the matching rate, we can understand the effectiveness of a company's CS activities. This has a positive effect on hastening the company's successful implementation of the CS program.

Moreover, a waste of manpower and capital can be avoided to lower the promotional cost of the CS program. Hence, by matching rate in planning operational strategy, strengthening the corporation constitution, elevating the enterprise's competitiveness and reducing operating costs, we have forward-looking indicatory functions.

At the same time, the successful experience of the case-company in the CS program can not only be the benchmark for other companies. Its methodology in conducting a customer satisfaction survey and its analysis can provide the higher level executives with useful referential data. This will not only dispel the doubts of companies that have not yet promoted the CS program in planning concrete issues and operations, but also can point out a path of continuation for companies that have already implemented the CS program.

In the future, if further research can be conducted on the influential weight of each functional characteristic on the total CSI, and combined with the matching rate concept proposed by this paper, we believe that a correct operational strategy can be developed and, with reasonable planning and proper utilization of resources, the company would soon arrive at the state of business excellence.

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