

## **Chapter 3 Impact of TQM on Overall Business Performance<sup>10</sup>**

### **3.1 Introduction**

This chapter presents the identification of overall business performance, the development of two theoretical models of TQM implementation on overall business performance, and the operationalization of theoretical constructs. Section 3.2 presents the identification and the explanations of overall business performance. The development of the model of TQM implementation and overall business performance is described in Section 3.3. Section 3.4 involves the development of the model of TQM implementation constructs and overall business performance. Section 3.5 discusses the operationalization of the theoretical constructs. Finally, Section 3.6 summarizes this chapter.

### **3.2 Overall Business Performance**

An objective of this study is to obtain the effects of TQM implementation on overall business performance in Chinese manufacturing firms. One of the research questions is to identify what overall business performance within TQM is. Based on this identification, the research question “What are the effects of TQM implementation on overall business performance in Chinese manufacturing firms?” can be answered. The literature review indicated that different researchers adopted different indicators for measuring overall business performance. To date, no uniform measures have existed. Therefore, the constructs of overall business performance had to first be identified so that this research could be conducted.

#### **3.2.1 Identification of Overall Business Performance**

After various business performance measures had been evaluated, it was decided that four constructs of overall business performance would be adopted in this study: Employee satisfaction, product quality, customer satisfaction, and strategic business performance. In fact, these constructs were already implicitly addressed by Hackman and Wageman (1995). They stated “Deming, Ishikawa, and Juran share the view that an organization’s primary purpose is to stay in business, so that it can promote the stability of the community, generate products and services that are useful to customers, and provide a setting for the satisfaction and growth of organization members. The focus is on the preservation and health of the organization, but there also are explicitly stated values about the organization’s context and about the well-being of individual organization members”. The importance of the four constructs of overall business performance is described below.

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<sup>10</sup> Parts of this chapter were published in Zhang (2000c, 2000d, 2000e, 2000f) and Zhang et al. (2000).

### **Employee satisfaction**

Employee satisfaction should be one of a firm's key performance measures (Naumann and Giel, 1995). Employee satisfaction is seen as an important factor in business effectiveness because employee satisfaction can lead to behaviors by employees that affect a firm's functioning (Spector, 1997). Employees' negative feelings can lead to behaviors that are detrimental to firms. Organizational practices that maximize employee satisfaction will likely see employees who are more cooperative and willing to help the firm be successful. Employee satisfaction is a topic of interest to both researchers who study it and practitioners who work in firms (Naumann and Giel, 1995). Thousands of employee satisfaction studies can be found in the journals of organizational behavior and related fields. An increasing number of organizations also conduct employee satisfaction surveys to learn how employees feel about their jobs (Spector, 1997). Employee satisfaction is also an important factor in the European Model for Total Quality Management (1994), the Deming Prize (1996), and the American Baldrige Quality Award (1999). Ted (1996) stated that employee satisfaction is as important as customer satisfaction, as Ishikawa (1985) stated that a firm whose members are not happy and cannot be happy does not deserve to exist.

### **Product Quality**

Product quality is one of the most important factors for a manufacturing firm to be successful in the world market. It is argued that a quality image, once obtained, can improve a firm's ability to compete, as well as its long-term opportunity for success (Pfau, 1989). DuBrin (1995) stated that business strategy development must place a high priority on product quality, which is a crucial hinge for business success or failure in today's quality-performance-oriented markets. Product quality has become a major business strategy (Feigenbaum, 1991). Ahire et al. (1996a) suggested that improving product quality be the prime objective of a firm's quality management efforts, and product quality be used as a primary indicator of the firm's quality efforts. Increasingly, firms are recognizing the strategic importance of product quality (Anderson et al., 1994a). Product quality is increasingly viewed as a strategic asset to improve a firm's global competitiveness (Steingard and Fitzgibbons, 1993). The literature review by Anderson et al. (1995) showed that product quality has often been cited as the highest competitive priority, an issue of strategic importance and survival, and a means of competitive performance. The Japanese quality revolution opened the way for Japan to become an economic superpower (Juran, 1994).

### **Customer Satisfaction**

Customer satisfaction has recently drawn much more attention than ever before. According to Fornell (1992), not only do many firms continually monitor customer satisfaction at the firm level, but some countries also make the effort to measure customer satisfaction on a nationwide basis (e.g., Sweden, US, Japan, Singapore, and EC countries). Customer satisfaction should be one of firms' key performance measures (Naumann and Giel, 1995). The attainment and maintenance of satisfactory levels of customer satisfaction is today fundamental determination for business health, growth, and economic viability

(Feigenbaum, 1991). The Malcolm Baldrige National Quality Award (1999), a case in point, considers customer-focused results the most important. For the European Quality Award (1994), customer satisfaction is the most important in terms of points assigned. According to Fornell et al. (1996), customer satisfaction is a new type of market-based performance measure for firms. It provides an important measure of the firm's past and current performance, as well as future financial health. Customer satisfaction represents a new means of evaluating performance for the modern firm and the modern economy. Marketing scholars and practitioners have long recognized that customer satisfaction is an important and central concept, as well as an important goal of all business activities. Dean and Bowen (1994) believed that customer satisfaction to be the most important requirement for long-term organizational success. In fact, a firm can exist because the firm has customers; it is very clear that no customer means no business.

### **Strategic Business Performance**

Strategic business performance is the final result of running a manufacturing firm, which can reveal the effects of doing business, show the competitive capability of the firm in the marketplace and its financial health, and predict its future success or failure. Strategic business performance is a good indicator to test the effects of TQM implementation and of a firm's efforts in pursuing employee satisfaction, product quality, and customer satisfaction. According to Mann and Kehoe (1994), strategic business performance refers to those measures typically addressed by the firm's management board. The board is concerned with measuring a firm's performance in terms of its major goals such as profitability, sales growth, market share, annual sales, and exports. According to Naumann and Giel (1995), strategic business performance refers to market share, increased revenues, and/or profit. Lee et al. (1995) proposed a hierarchical structure for overall business performance in which a higher level performance includes market share and profitability. In this study, strategic business performance was identified as: Annual sales, sales growth, profits, market share, and exports. It is no doubt that the aim of any manufacturing firm is to stay in business and make profits in the marketplace. In essence, the five indicators of strategic business performance are highly related to market and profitability. In China, strategic business performance is not only emphasized by firms' top managers but also addressed by the governments.

### 3.2.2 Explanations of Overall Business Performance

#### Employee Satisfaction

Employee satisfaction<sup>11</sup> is defined as the degree to which employees like their jobs (Spector, 1997); it is simply how employees feel about their jobs and different aspects of their jobs. It is the extent to which employees like (satisfaction) or dislike (dissatisfaction) their jobs. Employee satisfaction is an attitudinal variable, and can be considered as a global feeling about the job or as a related constellation of attitudes about various aspects or facets of the job. The global approach is used when the overall or bottom line attitude is of interest; for example, if one wishes to determine the effects of people liking or disliking their jobs. Most of the research adopting the global approach was to study the relationships between global employee satisfaction and other variables of interest. The facet approach is used to identify which parts of the job produce satisfaction or dissatisfaction, and can provide a more complete picture of an employee's job satisfaction on different facets. This can be very useful to firms that wish to identify areas of dissatisfaction that they can improve upon. Sometimes, both approaches can be used in order to obtain a complete picture of employee job satisfaction (Spector, 1997).

Employee satisfaction is not a static state but is subject to influence and modification from forces within and outside an individual, which are his or her own personal characteristics and the immediate working environment (Baran, 1986; Lam, 1995). In one firm, some employees may be satisfied and others may not. Individuals differ in how they respond to work conditions. While some employees may be highly satisfied with a particular job, other employees may find the same conditions extremely dissatisfying (Cherrington, 1995). An important issue surrounding employee satisfaction is: Will employee satisfaction increase or decrease as a result of a better benefit package, a new training program, or some other change in human resource practices? Many factors may affect employee job satisfaction. Among them are, for example, working environment, relationships with supervisors and colleagues, promotion opportunities, pay, equality, job characteristics, compensation and reward systems, and job security (Lam, 1995; Spector, 1997). Smith et al. (1969) developed a job descriptive index to measure employee satisfaction, which has been used across a wide variety of demographic groups. Their instrument consists of 72 items for measuring five theoretical and practical dimensions of employee satisfaction: Satisfaction with work itself, pay, promotion, supervision, and coworkers.

Studies of employee satisfaction have determined that job attitudes are influenced most by the qualitative aspects of the job (Cherrington, 1995). Good pay policies generally create positive satisfaction with pay. Supervisors who are fair, considerate, and competent generally create positive feelings of satisfaction with supervision. However, employee satisfaction is also related to other variables not directly associated with the job, such as age, sex, and work values. Employees with a strong work ethic also report greater satisfaction than do those

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<sup>11</sup> In essence, employee satisfaction is synonymous with job satisfaction. Therefore, the terms "employee satisfaction" and "job satisfaction" are interchangeable. Spector (1997) used the term "job satisfaction" in his 1997 book.

who reject the work ethic. Satisfaction with a job is apparently influenced by the values and expectations that employees bring with them to the job. Satisfaction on the job is also influenced by what has happened to employees off the job-just as work influences a person's satisfaction with life in general, so too does the quality of life away from work influence satisfaction with work. The frustrations and difficulties people face in their personal lives have contributed to the general decline in employee job satisfaction.

### Product Quality

Many definitions of "quality" exist. Deming (1986) defined it as satisfying the customer, not merely to meet his expectations, but to exceed them. His philosophy thus starts and finishes with the customer. Juran and Gryna (1993) defined quality as customer satisfaction or fitness for use. Quality is judged by the customer or user, thus the aim is to satisfy the customer. Crosby (1979) defined quality as conformance to requirements, thus making quality tangible, manageable, and measurable. Feigenbaum (1991) defined quality as the total composite product and service characteristics of marketing, engineering, manufacture, and maintenance through which the product and service in use will meet the expectations of the customer. Terms such as reliability, serviceability, and maintainability make up the composite of product and service quality. He argued that quality is a multi-dimensional entity and there are balances between various individual quality characteristics. Quality is dynamic in nature because customers' expectations are subject to change. Ishikawa (1985) defined quality as the development, design, production and service of a product that is most economical, most useful, and always satisfactory to the consumer. Two components of quality (Juran and Gryna, 1993) are listed in Table 3.1.

Table 3.1 Two Components of Quality

Manufacturing industries	Service industries
Performance	Accuracy
Reliability	Timelines
Durability	Completeness
Ease of use	Friendliness and courtesy
Serviceability	Anticipating customer needs
Esthetics	Knowledge of server
Availability of options and expandability	Esthetics
Reputation	Reputation

Quality is a judgment by customers or users of a product or service; it is the extent to which the customers or users believe the product or service surpasses their needs and expectations (Gitlow et al., 1989). In the ISO 9000 series standards, quality is defined as totality of characteristics of an entity that bear on its ability to satisfy stated and implied needs (ISO 8402, 1994). Reeves and Bednar (1994) compared various quality definitions in their paper. On the basis of their literature review, quality can be defined as excellence, value, conformance to specifications, fitness for use, loss avoidance, and meeting and/or exceeding customers' expectations. They also compared the strengths and weaknesses of these quality

definitions in their paper. Thus, based on the author's extensive literature review, quality is defined as conformance to specifications in this study. Thus, product quality is defined as *conformance to product specifications*.

The major strengths of this definition are that: It is relatively straightforward to use a conformance-to-specifications definition to measure quality. Firms can assess whether their quality conforms to the established specifications. As the world's economy becomes more internationalized, conformance to specifications is increasingly important. If customers' needs and expectations are governed by specific requirements or standards, conformance to specifications is the most appropriate and easily measured definition of quality. Thus, the more subjective definitions of excellence, value, and meeting and/or exceeding customers' satisfaction become unnecessary (Reeves and Bednar, 1994).

In fact, quality as conformance to specifications has been used extensively in China. Every quarter, the China State Bureau of Quality and Technical Supervision samples industrial products for inspection in order to supervise firms, with the aim of improving product quality. If sampled products do not conform to product specifications, they are judged as nonconforming products. Product specifications are the only standard used for such a judgement<sup>12</sup>.

### **Customer Satisfaction**

Customer<sup>13</sup> satisfaction is defined as the degree to which a firm's customers continually perceive that their needs are being met by the firm's products and services (Anderson et al., 1994). According to the literature review by Anderson et al. (1994), at least two different conceptualizations of customer satisfaction can be distinguished: Transaction-specific and cumulative. From a transaction-specific perspective, customer satisfaction is viewed as a post-choice evaluative judgment of a specific purchase occasion. By comparison, cumulative customer satisfaction is an overall evaluation based on the total purchase and consumption experience with a product or service over time. Thus, overall customer satisfaction is a more fundamental indicator of the firm's past, current, and future performance. Customer satisfaction is a customer's feelings of pleasure or disappointment resulting from comparing a product's perceived performance (or outcome) in relation to his or her expectations. Customer satisfaction is a function of perceived performance and expectations. If the performance falls short of the expectations, the customer is dissatisfied. If the performance matches the expectations, the customer is satisfied. If the performance exceeds the expectations, the customer is highly satisfied or delighted (Naumann and Giel, 1995).

Besides quality of products and services, customer satisfaction can also be influenced by price (Fornell et al., 1996; Naumann and Giel, 1995). If customers' perceptions of benefits match price exactly, customers will be satisfied. If the benefits are viewed to be less than the

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<sup>12</sup> This paragraph was obtained from the author's previous publications: Zhang (1998a, 2000b).

<sup>13</sup> "Customer" is the recipient of a product provided by the supplier (ISO 8402, 1994). In this study, the term refers to external rather than internal customer.

price, then customers will feel they are not getting their money's worth and will indicate very low levels of satisfaction (Naumann and Giel, 1995).

In fact, customer satisfaction is not static, but continues to evolve in an upward spiral. The diversity of product offerings has conditioned customers to have higher and higher expectations (Naumann and Giel, 1995). The customer's opinions of products and services may change very rapidly, the change toward a negative direction occurring considerably faster and more easily than increasing customer satisfaction. A great deal of work must be done in order to increase customer satisfaction, but only one failure may cause dissatisfaction.

### **Strategic Business Performance**

Strategic business performance consists of annual sales, sales growth, profits, market share, and exports. According to the China Statistical Yearbook (1998), annual sales refer to the total volume of industrial products sold in currency terms within one year, even though the sold products were made in a different year. Annual sales include the value of the sold finished products, sold semi-finished products, industrial services rendered to other firms, products provided for a firm's own construction or well-being department, self-made production equipment among other items. Annual sales growth refers to the ratio of annual sales difference between this year and the previous year, divided by the annual sales volume in the previous year. Profits refer to the total profits gained by the firm. Market share refers to the percentage of a firm's product output compared with the same kinds of product output produced by all firms located in China in the same industrial sector. Market share, in this study, refers to local market share. Exports include the value of various products and services sold in foreign countries. Note that the sale of products in Hong Kong, Macao, and Taiwan is considered exporting, although the three districts belong to China.

## **3.3 Model of TQM Implementation and Overall Business Performance**

### **3.3.1 Hypotheses Between TQM Implementation and Overall Business Performance**

TQM has been widely implemented in various firms around the world. TQM is now considered by virtually all leading firms and quality practitioners as the way forward, to gain a competitive edge (Goh and Ridgway, 1994). There are many discussions about the benefits of implementing TQM. Many firms have arrived at the conclusion that effective quality management can improve their competitive abilities and provide strategic advantages in the marketplace (Anderson et al., 1994a). In recent years, much research has been conducted on the effects of TQM implementation on overall business performance. Many researchers, in one way or other, have argued that it has positive effects on employee satisfaction, product quality, customer satisfaction, and strategic business performance (e.g., Adam, 1994; Knotts et al., 1994; American Quality Foundation and Ernst & Young, 1991; United States General Accounting Office, 1991).

TQM provides people with opportunities to learn and develop themselves through joint problem-solving efforts. Meeting clear and often challenging customer requirements and working to improve work processes continuously provide task challenges that should both test and stretch members' skills. Insistent emphasis on teamwork and cross-functional relationships provides many opportunities for social interaction and social reinforcement (Hackman and Wageman, 1995). A study conducted by Lam (1995) and Adam (1994) suggested that TQM implementation has positive effects on employee satisfaction. A comprehensive study jointly conducted by the American Quality Foundation and the accounting and consulting firm Ernst & Young (1991) studied the TQM efforts of more than 500 various firms in the US, Canada, Germany, and Japan. They found that process improvement methods, strategic plan deployment, and supplier certification programs have significant impact on quality, regardless of industrial sector and country. TQM has been widely recognized and successfully implemented in many firms, giving them the edge in both international and local competitiveness through the production of high quality products that not only meet customers' needs, but also delight them (Goh and Ridgway, 1994). Indeed many quality practitioners believe that implementing TQM is an effective means of improving product quality, removing waste. It is a way of managing to improve not only product quality, but also the effectiveness, flexibility, and competitiveness of a business as a whole. It has been shown that TQM implementation leads to quality conformance and customer satisfaction (Forza and Filippini, 1998). Choi and Eboch (1998) suggested that TQM implementation has an impact not only on customer satisfaction but also on product quality. The study conducted by Adam (1994) indicated that quality improvement practices have positive effects on customer satisfaction, profit, and sales growth, and Mann and Kehoe (1994) suggested that TQM implementation has positive effects on annual sales, market share, and export market. Zairi et al. (1994) suggested that it leads to improvement of bottom-line results such as profits. Therefore, it follows that TQM implementation will have a positive effect on the firm's market share and profits, although mediated through customer satisfaction. Dean and Bowen (1994) suggested that the goal of satisfying customers is fundamental to TQM. Easton and Jarrell (1998) found that firms' accounting variables and stock returns have improved due to adopting TQM. Most of the TQM programs claim to help a firm increase customer satisfaction, employee satisfaction, and productivity (Wollner, 1992). The US General Accounting Office (1991) reported that 1988 and 1989 Baldrige finalists and winners increased their employee satisfaction, product quality, customer satisfaction, market share, sales per employee, and return on sales. There have been many cases showing that firms attained great success through implementing TQM; the success of Japanese industry is due primarily to its TQM implementation (Ikezawa, 1993). Based on these empirical research findings, the following four hypotheses were proposed:

*Hypothesis H1T: TQM implementation has a positive effect on employee satisfaction.*

*Hypothesis H2T: TQM implementation has a positive effect on product quality.*

*Hypothesis H3T: TQM implementation has a positive effect on customer satisfaction.*

*Hypothesis H4T: TQM implementation has a positive effect on strategic business performance.*



### 3.3.2 Hypotheses Among Overall Business Performance Constructs

Research has been conducted on the relationships among employee satisfaction, product quality, customer satisfaction, and strategic business performance (annual sales, sales growth, profits, market share, and exports). Saha (1989) argued that Japanese employees possess superior motivation compared to their counterparts elsewhere in the industrialized world, with greater dedication and commitment to their work. These characteristics will absolutely contribute to product quality. It is more likely that satisfied employees will have higher dedication and commitment. It has been stated that, for the quality of any firm's products to improve, it must require, motivate, and reward change on the part of all parties concerned (Juran and Gryna, 1993). Anderson et al. (1995) suggested that employee satisfaction has a significant effect on customer satisfaction; it is the foundation for a firm in pursuing customer satisfaction. Feigenbaum (1991) suggested that employee motivation affects product quality. Further, it is needed to support customer satisfaction (Dean and Bowen, 1994). According to George (1992), understanding what is important to your customers is only one aspect of your relationship with them. A survey reported that 68% of customers switched because of the indifference of one of the supplier's employees. Total customer service contributes to total customer satisfaction. Tornow and Wiley (1991) found that employees' perceptions and attitudes are positively related to customer satisfaction. The research conducted by Anderson et al. (1995) suggested that satisfied employees have positive effects on customer satisfaction. In fact, within a firm, employees are the ones who can produce high quality products and deliver satisfaction to customers. It is obvious that satisfied employees will contribute to improving product quality and customer satisfaction through their commitment. Satisfied employees will also make the extra effort and contribute their best performance to ensure the success of their firms through improving product quality and customer satisfaction. Therefore, the following two hypotheses were proposed:

*Hypothesis H1D: Employee satisfaction has a positive effect on product quality.*

*Hypothesis H2D: Employee satisfaction has a positive effect on customer satisfaction.*

Much research has confirmed the strategic benefits of product quality. It has been shown to contribute to greater market shares and return on investments (Cole, 1992; US General Accounting Office, 1991), as well as lower manufacturing costs in the long run and improved productivity (Garvin, 1983). The manufacturing of top quality products is recognized as one of the most important strategic objectives of modern manufacturing firms. It is related to profits, market share, and economic survival in the international world of competition (Wacker and Sheu, 1994). The Boston Consulting Group and Harvard Business School faculty have developed the widely quoted Profit Impact of Marketing Strategy database. It has been cited as one source supporting market share as positively and strongly related to perceived quality of a firm's products (Buzzell and Wiersema, 1981; Craig and Douglas, 1982; Garvin, 1984; Phillips et al., 1983). Longenecker and Scazzero (1993) conducted a case study in a manufacturing firm that lost a number of key customers due to its product quality problems. Primrose and Leonard (1988) suggested that product quality has a direct effect on sales, and consequently profits, and Anderson et al. (1994) suggested that product quality has a positive impact on customer satisfaction, providing high quality products and high customer satisfaction is rewarded by economic returns. Deming (1986)

stated that improving product quality can reduce costs because of less rework, fewer mistakes, and better use of machine-time and materials. Thus, firms can capture the market with better product quality. Finally, firms will stay in business. Low product quality creates dissatisfied customers who will not only be more open to considering competitors' offerings but will also be likely to discuss their dissatisfaction with other potential customers. In short, improving product quality can improve firms' profits (Reed et al., 1996). Reeves and Bednar (1994) reported that customers are satisfied only when the firm provides superior product quality at reasonable prices; that is, when the value offered by products is superior to that of the competing products. Therefore, high quality products at reasonable prices will attract customers, thus improving the firm's strategic business performance. DuBrin (1995) stated that product quality can contribute to sales growth and market share. Juran and Gryna (1993) considered that the evidence of the importance of quality to retaining present customers is dramatic. Hackman and Wageman (1995), based on Deming's writing, stated that producing quality products is not merely less costly but, in fact, is absolutely essential to long-term organizational survival. According to Juran and Gryna (1993), the longer a firm keeps a customer, the larger the profit will be. The extensive literature review by Anderson et al. (1994a) suggested that a good way to satisfy customers is by delivering and improving product quality. Quality has a positive impact on customer satisfaction, profitability, and market share. Finally, the firm's competitive advantages in the market place will be enhanced. Therefore, the following two hypotheses were proposed:

*Hypothesis H3D: Product quality has a positive effect on customer satisfaction.*

*Hypothesis H4D: Product quality has a positive effect on strategic business performance.*

Numerous studies have shown that high level of customer satisfaction is strongly related to firms' profitability. Any firm with low customer satisfaction will experience a continual erosion of its customer base, resulting in declining market share (Naumann and Giel, 1995). Rust and Zahorik (1993) suggested that customer satisfaction has positive effects on customer retention and market share. They portrayed customer satisfaction as an important indicator of a firm's overall financial health, largely because it is perceived to be a key indicator of the firm's market share and profitability. Simply stated, satisfied customers will repeat their purchases of products, increasing the firm's market share and profits. According to George (1992), customer satisfaction is essential to retaining customers, which can give profits a critical boost. Retention of customers is important because it costs more to acquire a customer than to keep one. Deming (1986) asserted that dissatisfied customers are detrimental to a firm's further development. Zairi et al. (1994) suggested that customer satisfaction can lead to an increase in a firm's market share and profits. The research conducted by Cronin and Taylor (1992) suggested that customer satisfaction has a significant effect on purchase intentions. According to Fornell (1992), increases in customer satisfaction are generally believed to reduce marketing costs, lower transaction costs (e.g., contract negotiations, order processing, bargaining), reduce customer turnover, and enhance reputation (positive customer word of mouth). Anderson et al. (1994) reported that higher customer satisfaction should increase customer loyalty, insulate current market share from competitors, lower transaction costs, reduce failure costs and the costs of attracting new customers, and help to build a firm's reputation in the marketplace. The successful

experiences in Haier Group<sup>14</sup> suggested that customer satisfaction can lead to increased market share, profit, sales, and exports (Zhangruimin, 1998). Thus, an additional hypothesis was proposed as follows:

*Hypothesis H5D: Customer satisfaction has a positive effect on strategic business Performance.*

### **3.3.3 Model Formulation**

Based on the above nine hypotheses, a theoretical model of TQM implementation and overall business performance was developed, and is displayed in Figure 3.1. The links between TQM implementation, employee satisfaction, product quality, customer satisfaction, and strategic business performance are incorporated in one single model.

In these nine hypotheses, TQM implementation is an independent variable and employee satisfaction, product quality, customer satisfaction, and strategic business performance are dependent variables. In the first four hypotheses (H1T-4T), the relationships between the independent variable (TQM implementation) and dependent variables are examined. In the last five hypotheses (H1D-5D), the relationships among the four dependent variables are studied. To the best of the author's knowledge, no researchers have empirically examined the relationships between TQM implementation and employee satisfaction, product quality, customer satisfaction, and strategic business performance in a single model.

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<sup>14</sup> Haier Group is a Chinese manufacturing firm producing electrical appliances. This firm enjoyed a high reputation in terms of product quality, service quality, and customer focus.

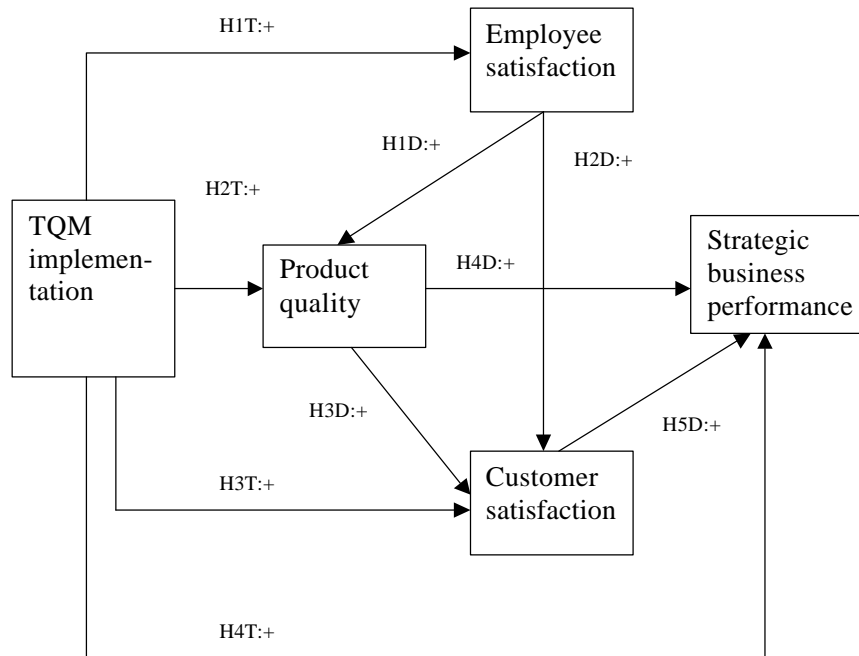


Figure 3.1 Theoretical Model of TQM Implementation and Overall Business Performance

### 3.4 Model of TQM Implementation Constructs and Overall Business Performance

In this research, TQM implementation is a large concept composed of 11 constructs. In order to understand whether different TQM implementation constructs have different effects on overall business performance, the individual effects of TQM implementation constructs are studied.

### **3.4.1 Hypotheses Between TQM Implementation Constructs and Overall Business Performance**

#### **Leadership**

According to Deming (1986), it is the responsibility of leadership to institute programs of ongoing training and education since through these programs, organizational members embrace a continuous process of learning-about their work, as well as for the purposes of self-actualization and intellectual growth. The aim of leadership should be to improve the performance of people and machines, to improve quality, to increase output, and simultaneously to bring pride of workmanship to employees. Top management also has a responsibility to improve the system, i.e., to make it possible, on a continuous basis, for everyone to do a better job with greater satisfaction. Management must declare a policy for the future, to stay in business and provide jobs for their employees. According to DuBrin (1995), top management may have the authority to choose a technological strategy. Choosing the most appropriate strategy greatly influences the success of the firm. Leadership involves having a vision of what the organization can become. Without effective leadership, it is difficult to sustain profitability and productivity, and the firm cannot remain competitive. Positive management actions and attitudes toward quality will result in increased employee commitment to both the TQM program and the firm's strategy (Lau and Anderson, 1998). It is top management's responsibility to analyze organizational problems, review its vision and mission, and appropriately define the strategy needed to achieve organizational goals and objectives. Strong, positive, open-minded leadership will give rise to long-term and sustainable business success (Randell and Mannas, 1999). The empirical results suggest the importance of organizational leadership and its impact on creating an organizational form and instituting organizational practices to bolster the goal of organizational survival (Anderson et al., 1995). Some research evidence supports the widely accepted view that the leader affects organizational strategic business performance (DuBrin, 1995). Therefore, the following two hypotheses were proposed:

*Hypothesis H1: Leadership has a positive effect on strategic business performance.*

*Hypothesis H2: Leadership has a positive effect on employee satisfaction.*

#### **Supplier Quality Management**

According to Juran and Gryna (1993), poor quality of supplier products results in extra costs for the purchaser; for example, for one appliance manufacturer, 75% of all warranty claims were traced to purchased components for the appliances. Materials and purchased parts are often a major source of quality problems. Garvin (1983) found that firms that manufacture the highest quality products have purchasing departments that rank quality rather than cost minimization as their major objective. Conversely, in firms with the lowest quality performance, he found that the primary objective of the purchasing department is to obtain the lowest price for technically acceptable components. Newman (1988) suggested that a firm pursuing long-term relationships with suppliers can benefit from improved quality and process performance and continuous cost reductions. Flynn et al. (1995) stated that suppliers can contribute to quality performance in a number of ways. For example, selection of suppliers should be based on product quality rather than price, and suppliers can contribute

to the product design process through inclusion in the firm's product design teams, where the suppliers provide input about the capabilities of prospective materials and parts. Leonard and Sasser (1982) reported that purchased materials and parts are a dominant source of process variability. Therefore, improving supplier quality management will contribute to the improvement of the firm's product quality. Thus, the following hypothesis was proposed:

*Hypothesis H3: Supplier quality management has a positive effect on product quality.*

### **Vision and Plan Statement**

Kano (1993) proposed that vision can encourage employees to work hard at improving quality. The research conducted by Bart and Baetz (1998) indicated that there is significant difference observed between firms with and without vision statements in terms of financial measures. Further, a vision statement can influence organizational members' behaviors and improve resource allocation. Quality policies contribute to firms improving product quality (Motwani et al., 1994). It is obvious that a targeted quality goal can help a firm maintain a constant quest for increasing quality levels (Aravindan et al., 1996). Goal-setting theory predicts that motivation is greatest when people focus their attention on achieving clear, specific, and challenging goals (Locke and Latham, 1990). Of course, a quality improvement plan, if implemented effectively, can contribute to improving product quality. Thus, the following hypothesis was proposed:

*Hypothesis H4: Vision and plan statement has a positive effect on product quality.*

### **Evaluation**

Evaluating the situation in a firm's quality management practices provides an important base for the firm to improve its quality management practices. The availability of quality-related information can have positive effects on product quality (Motwani et al., 1994). Ishikawa (1985) also stated that the analysis of quality-related costs can be used to highlight cost savings that can be achieved by doing the work right the first time. Feigenbaum (1991) suggested that using modern information methods for collecting, storing, processing, and evaluating various pieces of information can greatly affect product quality. The new, improving methods of data processing have made available to management far more useful, accurate, timely, and predictive information upon which to base the decisions that guide the firm's future business. It is obvious that relevant quality information available can be used for quality improvement. Thus, the following hypothesis was proposed:

*Hypothesis H5: Evaluation has a positive effect on product quality.*

### **Process Control and Improvement**

Process management focuses on managing the manufacturing process so that it operates as expected: Without breakdowns, missing materials, fixtures, tools, etc., and despite workforce variability (Flynn et al., 1994). Process control can make the process stable. Process improvement aims at managing and continually reducing variation. The reduction in process variation leads to benefits such as increasing output uniformity, continual reduction

of rework and mistakes and of machine time and materials (Deming, 1986). According to Juran and Gryna (1993), a major reason for quantifying process capability is to be able to compute the ability of the process to hold product tolerances. Thus, if process capability can ensure production requirements, various processing parts or components can be ensured automatically. Feigenbaum (1991) stated that machines and mechanization are a very important factor affecting product quality. Therefore, good equipment maintenance can contribute to product quality (Ollila and Malmipuro, 1999). The importance of quality tools, such as the seven QC tools, as aids in the work to improve quality has been stated by Gaafar and Keats (1992), Ginder (1990), Imai (1986), and Mizuno (1979). Mizuno (1979) wrote "These tools have been used as effective means of analysis and control, and they have contributed significantly to quality improvement." According to Juran and Gryna (1993) and Anderson et al. (1994a), statistical process control, when effectively implemented and practiced, brings about process improvements; first by eliminating special causes of variation and, second, by reducing common causes of variation. Much research has shown that good process management and using relevant quality tools have a positive effect on product quality (e.g., Adam, 1994; Mann and Kehoe, 1994). Thus, the following hypothesis was proposed:

*Hypothesis H6: Process control and improvement has a positive effect on product quality.*

### **Product Design**

For complex products, errors during product development cause about 50% of fitness-for-use problems (Juran and Gryna, 1993). The author of this study has suggested that using experimental design and quality function deployment have positive effects on improving product quality (Zhang, 2000a). He also presented an example of using experimental design in new product design, which contributed greatly to product quality (Zhang, 1998b). Using reliability engineering can help to increase a product's failure resistance and tolerance of failures (Kanji and Asher, 1996). According to Gatenby et al. (1994), concurrent engineering can contribute to fast and high-quality product realization. Of course, product design quality will be improved if product designers have more shop floor and marketing experiences. Sound product design can contribute to the improvement of product quality ahead of competitors, increasing a firm's competitive advantage in the marketplace. Thus, the following hypothesis was proposed:

*Hypothesis H7: Product design has a positive effect on product quality.*

### **Quality System Improvement**

A documented quality system helps employees understand exactly what they can do in their work areas. There are many benefits to be derived from implementing ISO 9000 standards, such as reduced wastage, increased customer satisfaction, employee morale, more efficient and responsive organization, better position in the market place, and bigger profits (Mirams and McElheron, 1995). Randall (1995) stated that adopting ISO 9000 can produce the following benefits: Improved efficiency of operations; improved utilization of time and materials; clearly defined responsibilities and authorities; improved accountability of individuals, departments, and systems; improved communication and quality of information;

formalized systems with consistent quality, punctual delivery, and a framework for future quality improvement; fewer rejects, less repeated work and warranty costs; less scrap, etc. Empirical study shows that firms with ISO 9000 certification reported significantly higher quality than those without (Voss and Blackmon, 1996). Many researchers indicated that having an ISO 9000 certificate can help firms improve product quality (e.g., Motwani et al., 1996). Thus, the following hypothesis was proposed:

*Hypothesis H8: Quality system improvement has a positive effect on product quality.*

### **Employee Participation**

Over the past decade, numerous American firms have introduced employee participation programs such as job rotation, team-based work, and shop floor decision-making, with the expectation that these measures will lead to employee satisfaction (Finlay and Marin, 1995). Working in groups can enhance many members' job satisfaction. Being a member of a work group makes it possible to satisfy more needs than if one worked alone (DuBrin, 1995). Juran and Gryna (1993) stated that the most important benefit of QC circles is their effects on employees' attitudes and behavior. QC circles enable the individual to improve personal capabilities, increase the individual's self-respect, and help employees change certain personality characteristics. They increase the respect of the supervisor for the employees, increase employees' understanding of the difficulties faced by supervisors, and increase management's respect for employees. They change some employees' negative attitudes to the firm, reduce conflict stemming from the working environment, help employees better understand the reasons why many problems cannot be solved quickly, and instill in the employee a better understanding of the importance of product quality. According to Lillrank and Kano (1989), QC circles can improve employee morale and skill development of employees. Through participation, employees will make their jobs more enjoyable. Mann and Kehoe (1994) suggested that delegated teams and voluntary teams have positive effects on employee communication and morale. It is obvious that employees will be glad if their suggestions are implemented by the firm. As a result, employees may increase their satisfaction level. Therefore, the following hypothesis was proposed:

*Hypothesis H9: Employee participation has a positive effect on employee satisfaction.*

### **Recognition and Reward**

One of the most important reasons people work is to earn money. Even those intrinsically motivated to work because of the satisfaction they derive from their jobs must earn sufficient money. If their jobs do not provide adequate income, people are forced to seek other jobs, no matter how satisfying they find their current ones (Cherrington, 1995). Therefore, to effectively support organizational quality efforts, firms need to implement an employee compensation system that strongly links quality and customer satisfaction with pay (Brown et al., 1994). Rewards for quality appear to have a positive relationship with employee morale (Kassicieh and Yourstone, 1998). Giving public visibility to quality efforts that identify and remedy problems sends a strong message that such efforts are a valued part of employees' contributions to the firm (Wruck and Jenson, 1994). According to Herzberg's (1966) hygiene/motivator theory, recognition is one of the four motivators, which can



contribute to employee satisfaction when it is present. According to the equity theory, people attempt to maintain conditions of equity. Pay and other organizational rewards must be balanced with effort, skill, experience, and other inputs for a state of equity to exist (Cherrington, 1995). Therefore, employees will be more satisfied if their efforts can be rewarded and recognized. The expectancy theory suggests that money can be a powerful motivator if the proper relationships between effort, performance, and rewards are perceived. The expectancy theory predicts a strong relationship between money and motivation (Schwab, 1973). Money can be a powerful motivator when pay is based on performance. Therefore, the expectancy theory implies that employees will be more satisfied if they are provided money incentives for their efforts (Cherrington, 1995). Besides monetary reward, today's employees require reinforcement of a sense of accomplishment in their jobs and the positive recognition that they are personally contributing to achievement of firm goals (Feigenbaum, 1991). Cherrington (1995) stated that career development can provide increased satisfaction for employees. Therefore, position promotion can have positive effects on employee satisfaction. Recognition and reward activities are valued by employees, and therefore provide motivation or incentives. Effective recognition and reward activities can make employees commit to their jobs and make their jobs more enjoyable. Thus, the following hypothesis was proposed:

*Hypothesis H10: Recognition and reward has a positive effect on employee satisfaction.*

### **Education and Training**

Education and training can improve employees' knowledge and skills and have an important influence on their development. Thus, employees can generate innovative ideas for solving working problems. Training provides a forum for communication of new organizational strategy, values, and ways of performing work. Thus, employees' commitment and satisfaction may be enhanced. Deming (1986) stressed the importance of education and training for continual updating and improvement, identifying one source of human motivation at work as intrinsic motivation; more generally, growing, learning, and developing one's self. Employees inherently want to learn and develop. Cherrington (1995) stated that a successful training and education program will achieve the following benefits: Create more favorable attitudes, loyalty, and cooperation; and help employees in their personal development and advancement. Extensive literature review by Anderson et al. (1994a) suggested that an employee deserves to take pride in his or her work. Deming believed that this pride (as he often referred to it) comes from self-improvement, and that it is the firm's job to offer opportunities for continuous education. According to Cherrington (1995), most learning situations are intrinsically reinforcing because of the satisfaction associated with acquiring new knowledge or skills. Thus, the following hypothesis was proposed:

*Hypothesis H11: Education and training has a positive effect on employee satisfaction.*

## **Customer Focus**

In today's turbulent market environment, it is very clear that a firm's survival depends on its ability to satisfy customers' needs and expectations and to compete effectively in global markets. A successful firm recognizes the need to put the customer first in every decision. Analyzing and responding to customer complaints on a product is essential to minimizing customer dissatisfaction; it is obvious that extensively analyzing and using customer complaint information can contribute to customer satisfaction. The information obtained from customer satisfaction surveys can also be used for further improving customer satisfaction. In fact, providing warranty on sold products is a commitment to a firm's own product quality. Such efforts can contribute to customer satisfaction (Juran and Gryna, 1993). It is no doubt that the aim of any customer focus effort is to pursue customer satisfaction. Thus, the following hypothesis was proposed:

*Hypothesis H12: Customer focus has a positive effect on customer satisfaction.*

### **3.4.2 Hypotheses Among Overall Business Performance Constructs**

The five hypotheses among the four constructs of overall business performance were presented in Section 3.3.2. These five hypotheses are re-listed as follows:

*Hypothesis H1D: Employee satisfaction has a positive effect on product quality.*

*Hypothesis H2D: Employee satisfaction has a positive effect on customer satisfaction.*

*Hypothesis H3D: Product quality has a positive effect on customer satisfaction.*

*Hypothesis H4D: Product quality has a positive effect on strategic business performance.*

*Hypothesis H5D: Customer satisfaction has a positive effect on strategic business performance.*

### **3.4.3 Model Formulation**

Based on the above 17 hypotheses a model of TQM implementation constructs and overall business performance was formulated, which is displayed in Figure 3.2. The 11 boxes at the

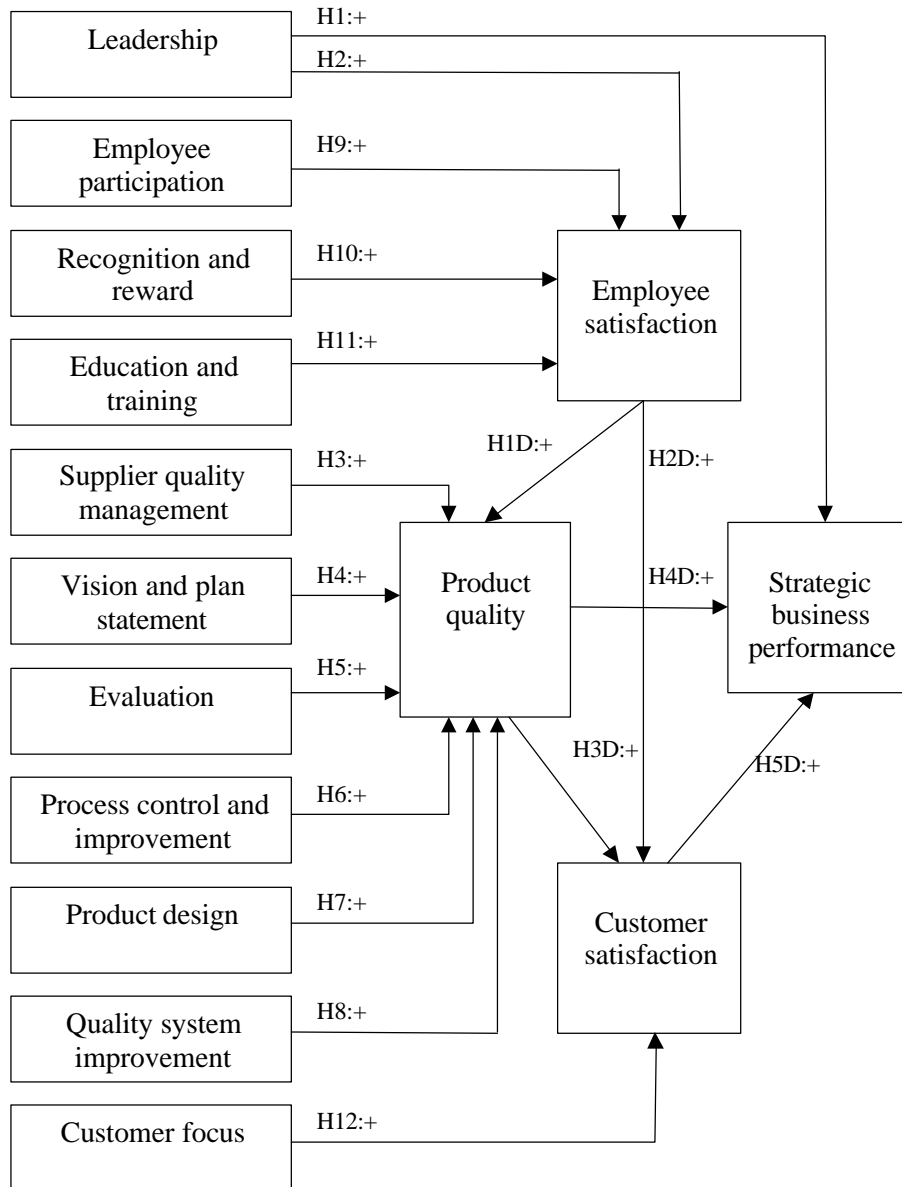


Figure 3.2 Theoretical Model of TQM Implementation Constructs and Overall Business Performance

left contain TQM implementation constructs. At the right are the four boxes representing the four constructs of overall business performance. In this model, all these TQM implementation constructs are regarded as independent variables. It should be noted that there might be some causal relationships among the 11 TQM implementation constructs. However, these relationships are beyond the scope of this study.

### **3.5 Construct Operationalization**

In order to empirically test the theoretical models hypothesized in this study, it was first necessary to operationalize these theoretical constructs so that empirical investigation was possible. Therefore, a set of items for measuring the constructs of TQM implementation, employee satisfaction, product quality, customer satisfaction, and strategic business performance had to be adequately developed. Items should be chosen or developed in a careful manner to tap as comprehensively as possible the conceptual domain of the theoretical constructs. The following subsections present how to operationalize these constructs.

#### **3.5.1 TQM Implementation**

Several studies dealing with empirically validated scales for TQM implementation have been conducted (i.e., Ahire et al., 1996; Flynn et al., 1994; Saraph et al., 1989). The three instruments developed by the aforementioned researchers differ in terms of constructs and measurement items, each instrument having its own strengths and weaknesses (Their differences were addressed by Ahire et al. [1996]). However, these three instruments could not be adopted by this study since it adopted different TQM implementation constructs and targeted different samples. Therefore, a new set of items for measuring these constructs for Chinese manufacturing firms had to be developed. The existing instruments developed by these researchers did, however, give some insights into operationalizing the 11 TQM implementation constructs. In this study, based on the existing literature review, the definitions and explanations of the 11 constructs, the set of TQM implementation practices that support TQM implementation, and the special characteristics of Chinese manufacturing firms, 79 items were developed for measuring the 11 constructs of TQM implementation (see Table 3.2). A widely used 5-Likert scale was employed for scoring responses (1: strongly disagree; 2: disagree; 3: neutral; 4: agree; 5: strongly agree). Appendix 1 lists these 79 measurement items.

A comparison between this and other instruments was conducted in order to identify the characteristics of this instrument. In this study, only three instruments were selected for this comparison. They were developed by Saraph et al. (1989), Flynn et al. (1994), and Ahire et al. (1996), respectively. The instrument developed in this study has two unique characteristics, discussed in the following paragraphs.

The first is that this instrument covers a broader scope of TQM in comparison with the other researchers' instruments. This instrument has 11 scales that are broader than the scales in the other instruments. Chapter 2 discusses this comparison. In addition, this instrument has 78

measurement items in total (the original instrument had 79 items and one was deleted after factor analysis), which is more than the other measurement items. This instrument, therefore, covers a broader scope of TQM.

Secondly, specific characteristics of Chinese manufacturing firms were taken into account in developing this instrument. Since its aim was to measure TQM implementation for Chinese manufacturing firms, the instrument had to be suitable for use in China. Thus, specific characteristics of Chinese manufacturing firms had to be taken into account in its development. For example, most Chinese firms were weak in terms of their visions and plans. Thus, “Vision and plan statement” was therefore one scale in this instrument. Most Chinese firms were trying to implement ISO 9000 in order to improve their quality systems. This instrument thus included the scale of “Quality system improvement”. Some Chinese top managers preferred to pursue short-term business success because of the nature of the country’s institutional system. Item 8 (top management pursues long-term business success) in Scale 1 (Leadership) was therefore a very important item for measuring leadership. This item could not be found in the existing instruments. Most Chinese firms implemented reward and penalty measures to strengthen their management. The item “employees’ rewards and penalties are clear” was therefore developed for Scale 9 (Recognition and reward). For details, please refer to Appendix 1, and note that it is beyond the scope of this thesis to address the characteristics of Chinese manufacturing firms.

Table 3.2 Operationalization of TQM Implementation

Scales	Item number
Leadership	8
Supplier quality management	6
Vision and plan statement	8
Evaluation	10
Process control and improvement	8
Product design	8
Quality system improvement	5
Employee participation	6
Recognition and reward	6
Education and training	6
Customer focus	6

### 3.5.2 Employee Satisfaction

According to Cherrington (1995), the best way to measure employee satisfaction is to either interview employees or ask them to complete a questionnaire. A questionnaire survey is the most popular method of measuring employee satisfaction since it is relatively short and can be administered to large numbers of employees simultaneously; interviews are more expensive and time consuming to conduct. According to Spector (1997), perhaps the easiest way to assess employee satisfaction is to use one of the existing scales, as their reliability and validity have been established. Several widely used facet employee satisfaction scales

are, for example, The Job Satisfaction Survey (JSS) by Spector (1985), The Job Descriptive Index (JDI) by Smith et al. (1969), The Minnesota Satisfaction Questionnaire (MSQ) by Weiss et al. (1967), and The Job Diagnostic Survey (JDS) by Hackman and Oldham (1975). There are another two global satisfaction scales, which are The Job in General Scale (JIG) by Ironson et al. (1989) and The Michigan Organization Assessment Questionnaire Subscale (MOAQ) by Cammann et al. (1979). In fact, The Job Diagnostic Survey includes a facet measure since it covers several areas of job satisfaction, specifically growth, pay, security, social, and supervision, as well as global satisfaction (Spector, 1997).

According to Cherrington (1995), absenteeism and turnover are frequently used as indirect measures of employee satisfaction. However, two types of absenteeism and turnover should be distinguished: Voluntary and involuntary. Voluntary absenteeism and turnover occur when employees have a choice of working or not working, and when they intentionally decide to miss work or quit. Involuntary absenteeism and turnover occur when employees miss work or are terminated for reasons beyond their control. It is not easy to identify whether an absence is truly involuntary or not; therefore, it is difficult to measure absenteeism. For employee turnover, employee dissatisfaction and economic conditions are the significantly related variables. Employees may leave their jobs when alternative jobs that better satisfy their needs become available. Research findings show that improved pay and promotion policies reduced the turnover level. Turnover rates are strongly influenced by economic conditions; when the economy is depressed and unemployment levels go up, turnover in most firms goes down. Therefore, it was very difficult to use absenteeism and turnover to measure employee satisfaction.

According to Spector (1997), the JIG and the MOAQ may be a good choice for the assessment of overall employee satisfaction when this, rather than facets, is of interest. Facet scales are often used to assess overall satisfaction by summing all of the individual facet scores. This can be justified by the fact that facets often correlate well with overall employee satisfaction. For example, Ironson et al. (1989) identified a 0.78 correlation of the JIG with the JDI and a 0.53 correlation of the JSS with the MOAQ. However, they also argued that overall employee satisfaction is not the same as the sum of individual facets. The summing of subscale scores assumes that all facets in the scale make equal contributions to overall satisfaction. In fact, it is unlikely that each facet has the same importance to every individual. Thus, the sum of facets is an approximation of overall employee satisfaction, but may not precisely match the overall satisfaction of individuals.

Spector (1997) stated that most research adopting the global approach studied the relationships between global employee satisfaction and other variables of interest. In this study, the relationships between employee satisfaction and TQM implementation, some TQM implementation constructs (e.g., leadership, education and training, recognition and reward, employee participation), product quality, and customer satisfaction were examined. Thus, the global approach was adopted.

In this study, there were some difficulties in measuring employee satisfaction in a reasonably precise way. First, each sampled firm received only one questionnaire; it was impossible to obtain employee satisfaction data from employees directly. Therefore, alternative procedures had to be adopted. However, it could not be concluded that the alternative sources were equivalent to asking the individuals directly about their job satisfaction. Second, most

Chinese manufacturing firms did not evaluate employee satisfaction. Thus, overall employee satisfaction remained to some extent unclear. Third, most respondents were quality managers, for whom it was difficult to precisely assess employee satisfaction in their respective firms. Fourth, respondents' overall satisfaction would affect their assessment of employee satisfaction. In this regard, employee satisfaction could not be precisely measured through respondents.

According to Spector (1997), there have been a number of attempts to use alternative procedures to assess employee satisfaction. Spector, Dwyer, and Jex (1988) asked supervisors to estimate the employee satisfaction of their subordinates. The correlation was 0.54 between subordinates and supervisors, suggesting that supervisors have better feelings about their employee job satisfaction. Glick et al. (1986) reported that observers estimate employees' job satisfaction after watching them work for approximately two hours. Again, there was moderate agreement between the two sources. Since most respondents had worked in their respective organizations for a long time (on average 16.26 years), it was assumed that they had a general perception about overall employee satisfaction. Thus, it was suitable to ask respondents to assess employee overall satisfaction instead of asking employees directly.

The Michigan Organization Assessment Questionnaire is a global satisfaction scale containing a three-item overall satisfaction subscale (Cammann et al., 1979), which is listed in Table 3.3. The scale is simple and short, which makes it ideal for use in questionnaires that contain many scales. For each item there are seven response choices: Strongly disagree, disagree, slightly disagree, neither agree nor disagree, slightly agree, agree, and strongly agree. Item scores are summed in order to yield an overall employee satisfaction score.

Table 3.3 Items from the Michigan Organizational Assessment Questionnaire Satisfaction Subscale

- 
1. All in all I am satisfied with my job
  2. In general, I do not like my job
  3. In general, I like working here
- 

However, the MOAQ could not be adopted directly in this study. First, each sampled firm received only one questionnaire. If this scale had been utilized, it would have measured respondents' overall satisfaction, rather than overall employee satisfaction in the firm. Thus, the research findings might have been biased. Second, after the three items in the MOAQ scales were carefully examined, it became very evident that the contents of the three items are very similar even though their wording is different. Thus, it was not surprising that subsequent studies using this scale found higher reliability (e.g., 0.87) (Spector, 1997). In fact, the three items can be combined to form only one: I am satisfied with my job. Based on this, it was decided that only one item would be used to measure overall employee satisfaction in this study: "What is overall employee satisfaction in your firm?". The respondents were asked to choose a number between 0 and 10 to 1 decimal place. The number 0 meant that employees were extremely unsatisfied, and 10 indicated that they were

extremely satisfied. The advantage of using such a scale to measure overall employee satisfaction was that respondents had to think about it before they chose an exact number. Thus, more reliable information could be obtained.

### **3.5.3 Product Quality**

The operationalization of product quality should be based on the definition of quality: Conformance to specifications. Thus, product quality can be measured by conformance to product specifications and other indicators that are the results of nonconformance to product specifications. According to current quality management practices in China, the finished product conformity rate is the most important index for the Chinese government to supervise manufacturing firms' product quality. If the firm's product cannot meet the requirements of product specifications, that product will be judged as a nonconforming product. Thus, the product manufacturer will be penalized by the Chinese government. In fact, one product consists of many components. Every component also has its specifications (e.g., material contents, size, weight, and hardness) according to design requirements. If a component does not conform to its specifications, the component will be judged as defective. Defective parts cannot be used for the final product. Therefore, internal defective rate is also a very important index for measuring product quality level. Due to nonconformance to specifications, internal failure costs (found prior to transfer of the product to the customer) will be caused. These costs include scrap, rework, failure analysis, and downgrade among others. If a product is found to be nonconforming after it is delivered to the customer, the firm will experience losses; namely, external failure costs. These costs would disappear if there were no defects. External failure costs include those such as warranty charges, complaint adjustment, returned materials, and allowances (Juran and Gryna, 1993). In fact, product specifications have no meaning if they are not related to customer needs and expectations. Thus, product performance, reliability, and durability are also very important indices for measuring product quality.

Ahire et al. (1996) used performance, reliability, and durability as part of indicators to measure product quality. These are also included in the eight dimensions of product quality identified by Garvin. Performance refers to a product's primary operating characteristics (Garvin, 1987). Increased complexity of products has emphasized the importance of product reliability (Feigenbaum, 1991), which reflects the probability of a product malfunctioning or failing within a specified time period. Durability is actually a measure of product life, the amount of use before a product deteriorates (Garvin, 1987).

Based on the literature related to the various measures of product quality, the quality definition adopted in this study, and the current measures for measuring product quality in Chinese manufacturing firms, seven items were used to measure product quality in this study: Performance, conformity rates, reliability, durability, internal defect rates, internal failure costs, and external failure costs. Five categories (1: worst in the industry; 2: below average; 3: average; 4: above average; 5: best in the industry) were used for scoring responses compared with the other firms within the same industry in China. Please see Appendix 2 for details.



### 3.5.4 Customer Satisfaction

After the literature on customer satisfaction was reviewed, it became evident that there is no consensus on how to measure customer satisfaction. According to Fornell (1992), The American Customer Satisfaction Index (ACSI) is a national index for providing a standardized measure across industries that can be used for comparative purposes. The ACSI measures the quality of the products and services as experienced by customers who consume them. An individual firm's ACSI represents its served market's (its customers') overall evaluation of total purchase and consumption experience. Hence, the ACSI represents a cumulative evaluation of a firm's market offering, rather than a person's evaluation of a specific transaction. The Customer Satisfaction Barometer (CSB) is a customer satisfaction index based on annual survey data from customers of about 100 leading firms in some 30 industries in Sweden. The CSB can measure a firm's quality of output as experienced by customers. Naumann and Giel (1995) also developed a customer satisfaction measurement for measuring customer satisfaction. However, these instruments for measuring customer satisfaction could not be adopted directly. In this study, each firm received only one questionnaire. Therefore, customer satisfaction information was from different respondents rather than from firms' customers. Therefore, this study only measured overall customer satisfaction based on respondents' perceptions. Thus, a new scale for measuring customer satisfaction had to be developed so that this study could be conducted.

According to Fornell (1992) and Hauser et al. (1994), customer satisfaction is an overall postpurchase evaluation of all experiences including transactions, product use, and service received. Deming (1986) suggested that the goal of firms should be to constantly improve their services and products for the customers. Customer satisfaction is dependent on a comparative judgement against some standard related to the lack of confirmation of expectations. Thus, dissatisfaction may be due to inherently poor services or products, or perhaps to the continuation of a once-acceptable level of services or products that no longer meet customer expectations, due to competitive marketing of improved standards or changing customer tastes (Rust and Zahorik, 1993). Anderson et al. (1994) suggested that the measurement of customer satisfaction has often been based on a customer's perception of the quality of products and services. The payoff for excellent customer service, along with high-quality products and services, is a high level of customer satisfaction (George, 1992). Based on the literature, there are two major factors affecting customer satisfaction; namely, product quality and service quality. Therefore, these were the two indicators used for measuring customer satisfaction in this study. It should be noted that product quality and service quality are related but not equivalent to customer satisfaction, which results from the comparison of expectations with actual performance (Cronin and Taylor, 1992).

Thus, overall customer satisfaction was operationalized through respondents' perceptions about customer satisfaction on quality of products and services provided by the firm. In fact, many Chinese manufacturing firms regularly conducted customer satisfaction surveys in order to improve customer satisfaction. Different firms used different means of obtaining customer satisfaction with their products and services. Therefore, the firms understood their customer satisfaction levels quite well. Thus, it was assumed that respondents (e.g., quality managers) could perceive their customer satisfaction. In fact, it would be very difficult to

obtain direct feedback from the customers of hundreds of sampled firms. For any study, there is a trade-off between the sample size and obtainment of objective performance results. The author balanced trade-off by using respondents (e.g., quality managers) because they would be the most familiar with customer satisfaction. Similarly, five categories (1: extremely unsatisfied; 2: unsatisfied; 3: average; 4: satisfied; 5: extremely satisfied) were used for scoring customer satisfaction levels.

In the field of quality management, some researchers have used alternative sources to measure customer satisfaction. For example, Anderson et al. (1995) used four items: Customer relations, product conformance, product performance, and customer satisfaction with product quality over the past three years. The responses were from respondents rather than customers. To the best of the author's knowledge, no empirical research has reported that the alternative sources (customer satisfaction data from respondents) are equivalent to customer satisfaction data obtained directly from customers.

### **3.5.5 Strategic Business Performance**

In order to allow respondents to easily provide information, five categories were used to measure annual sales, sales growth, profits, market share, and exports. For annual sales, objective measure was used to score responses. These categories were formulated on the basis of annual sales volume of total potentially sampled manufacturing firms. Perceptual measure (decreased a great deal, decreased slightly, stayed almost the same, increased slightly, and increased a great deal) was used to measure sales growth. Profits were measured by perceptual measure. Respondents were asked: "Do you think your firm was losing money badly, losing money slightly, breaking even, making some profits, or very profitable?" There were difficulties in measuring market share. Many Chinese firms did not precisely know their absolute market share in the domestic market. However, they did know which firm was the largest in terms of market share in the same industrial sector in the country. Thus, a relative market share was used in this study, calculated by the firm's annual product output divided by the annual product output in the largest firm in the same industrial sector in the country in the same year. Exports were measured by the value of exporting products divided by total annual sales within the same year. Please see Appendix 2 for details.

## **3.6 Summary**

First, the four constructs of overall business performance within TQM were identified as important for Chinese manufacturing firms: Employee satisfaction, product quality, customer satisfaction, and strategic business performance. These constructs were also explained in greater details. Second, a model of TQM implementation and overall business performance was developed, consisting of nine hypotheses. Third, a model of TQM implementation constructs and overall business performance was developed, consisting of

17 hypotheses. The aim of this model was to examine the effects of different TQM implementation constructs on different constructs of overall business performance. Finally, the 11 constructs of TQM implementation and the four constructs of overall business performance were operationalized. Thus, it was possible to empirically test the two theoretical models hypothesized in this study.

